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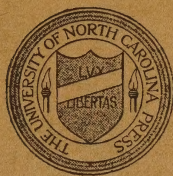
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HOW TO KNOW AND USE THE TREES

By WILLIAM CHAMBERS COKER  
AND  
ENID MATHERLY

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PLATE 1

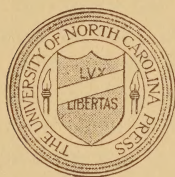


A GARDEN IN HARTSVILLE, S. C.  
Spanish bayonet and weeping mulberry in the foreground



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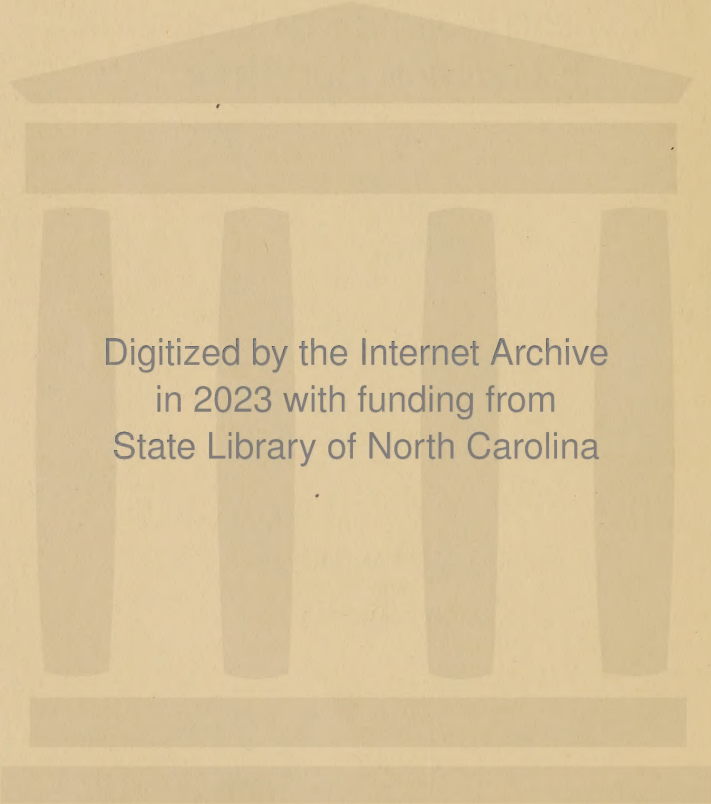


HOW TO KNOW AND USE THE TREES

By WILLIAM CHAMBERS COKER  
AND  
ENID MATHERLY

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## HOW TO KNOW AND USE THE TREES

### INTRODUCTION

Our Extension Bulletin published in 1921 on the *Design and Improvement of School Grounds* (Coker and Hoffmann) is now practically out of print. We have prepared the present one from a somewhat different point of view, and are emphasizing the trees of this state, particularly as regards their use for shade and ornament. We have included certain of the most useful exotic trees and also plans and suggestions for planting grounds and streets, which we hope may be of use to schools, churches, and towns. The species described and illustrated are by no means all that grow in North Carolina, but only those that we consider most useful for the purposes mentioned. We are, however, including a key to all the native species of the state in the hope that it may encourage a real botanical interest in our arborescent flora and be a help to teachers in determining species in a community. Included also is considerable material from the former bulletin on school grounds and from the *Trees of North Carolina* by Coker and Totten.

The pen drawings of trees on plates 29-39 were mostly done by Mrs. S. H. Hobbs, Jr.; those of white oak, European white birch, cherry birch, river birch, American olive, loblolly pine black spruce, Canada and Carolina hemlock, sourwood, yellow wood, hawthorn, swamp cypress, and black gum are by Mrs. Mary DeB. Graves; those of willow oak, water oak, laurel oak, pin oak, red oak, and scarlet oak are by Mrs. C. H. Fernald. The fruit of the yellow willow was copied by permission from the *Handbook of the Trees*, etc., by R. B. Hough, and flowers of the red maple and walnut (in part) and fruit of the bay willow were copied from Michaux's *Sylva of North America*. The Ginkgo fruit is adapted from Goebel.

The flora of North Carolina is very rich, and in no way is it richer than in the beauty and variety of its trees. There are



native in this state, according to our conservative treatment of the species, 166 kinds of plants that normally grow to tree size, and to this number it would be easy to add at least a dozen more hawthorns by a less reserved treatment of that problematic group, and a dozen plants by including certain shrubs that occasionally reach the size of small trees. We are including in the key ten introduced trees that have escaped or become naturalized to a noticeable extent. These ten are: China-berry tree, mimosa, Kentucky coffee tree, tree of Heaven (copal), osage orange, white mulberry, paper mulberry, white poplar, weeping willow, catalpa, Paulownia.

In the number of its trees our state is superior to any of the other states of the Union, with the exception of Florida and Texas. Florida stands first with about 328 native trees, including 38 species of hawthorn (*Crataegus*) (Small, *Florida Trees*, 1913); Texas is next with 198 native species, including only 9 species of hawthorn (Lewis, *The Tree of Texas*, 1915), but this includes 9 species that grow also in North Carolina and have been excluded by us as shrubs. Next after North Carolina comes Georgia with 134 trees (only 6 species of hawthorn counted), as estimated by Harper, and the probable occurrence of about 20 more is suggested (*Southern Woodlands* 1: 32. 1908). In this list Harper includes about 6 plants that we have considered as shrubs, but this is largely offset by his treatment of ashes (*Fraxinus*) and lindens (*Tilia*) of which only one species is given of each. Alabama follows Georgia in the number of its trees which, as listed by Harper, consist of 121 species, only 5 hawthorns included (*Geol. Survey of Alabama, Monograph* 8: 189. 1913). He supposes that the number will reach 140 or 150 when the flora is better known. It is surprising to find that the large state of California has only 94 species (Jepson, *Trees of California*, p. 13, 1909). In North Carolina we have 24 oaks of tree size, while California has but 13. In Minnesota (Clements, *et al.*, *Minnesota Trees and Shrubs*, p. iv, 1912), there are only 274 species of woody plants, trees, shrubs, and vines, while in North Carolina we have about 450 woody plants.



To a discerning person it is not necessary to say that to know the names of the trees and the few facts about them that are given in this bulletin is no more than a beginning of the knowledge and interest that should result from a long and intimate association with them. It is fascinating to watch the seasonal changes—the swelling of the buds and unfolding of the leaves with their delicate colors, each kind differing from all others in shade; their growth and change in tone to maturity, and the putting on of more cheerful colors in anticipation of death; the expanding flowers with their structure, odor, and insect visitors: the forming of the fruit, its ripening and its fate; the seeds with their germs and reserve foods and protective coats; the distribution and planting of the seeds; their sprouting and development into seedling and sapling; and the slow growth of the tree to full stature and strength.

In conclusion, may we suggest to the schools that a course in nature study be tried with trees for a subject? We believe that the children will be interested and benefited by this and that a few, perhaps, will make the delightful discovery that the study of nature is the life work for which they are best fitted. Those who make this discovery are apt to have a happy life before them, for there is no more humanizing or pleasing prospect than a lifetime of vital contact with the beauty and power of nature.

## KEY TO THE TREES OF NORTH CAROLINA

(NATIVE AND NATURALIZED)

### I. Cone-Bearing Trees: Mostly Evergreen. Gymnosperms.

#### A. Leaves needle-like, united in bundles.

Leaves five or more in a bundle.....*White Pine*

Leaves three or rarely four in a bundle.

Leaves ten to fifteen inches long; cones five to ten inches long.....*Long-leaf Pine*

Leaves five to ten inches long; cones three to five inches long.....*Loblolly Pine*

Leaves six to ten inches long; cones less than three inches long.....*Pond Pine*

Leaves three to four inches long; cones two to two and a half inches long.....*Black Pine*

Leaves two in a bundle.

Cones about three inches long, prickles stout.....*Table Mountain Pine*

Cones about two inches long or less, prickles weak.

Branches scaly; leaves not twisted.....*Short-leaf Pine*

Branches nearly smooth; leaves twisted.....*Scrub Pine*

#### B. Leaves single, linear, roundish or flattened.

Evergreen; cone not spherical.

Leaves abruptly narrowed to a little stalk.

Leaves extending in one plane; cones  $\frac{1}{2}$ - $\frac{3}{4}$  inch long.....*Hemlock*

Leaves spreading in all directions; cones 1-1 $\frac{1}{2}$  inches long.....*Carolina Hemlock*

Leaves sessile.

Leaves nearly round, not white beneath; cones pendulous

Leaves bluish green (glaucous), cones persisting for years.....*Black Spruce*

Leaves yellow-green; cones falling early.....*Red Spruce*

Leaves flattish, white beneath; cones upright...*Balsam*

Not evergreen; cone spherical

Leaves spreading in two rows (one plane).....*Swamp Cypress*

Leaves pressed against the twigs and all around it.*Pond Cypress*

#### C. Leaves very small, scale-like.

Fruit a small blue berry.....*Red Cedar*

Fruit a little cone about the size of a pea.....*Juniper*

Fruit a cone  $\frac{1}{2}$ - $\frac{3}{4}$  inch long.....*Arbor-Vitae*

### II. Broad Leaved Trees: Not Cone-Bearing. Angiosperms.

Leaves evergreen, splitting into strips, grouped at the top of a single stout stem (Monocotyledons).

Leaves several feet wide, fan-shaped.....*Palmetto*

Leaves not splitting into strips, usually not evergreen (Dicotyledons).



## A. Leaves compound, alternate on the twig.

### Leaves twice-compound.\*

Trunk and branches thorny or prickly.

Leaves less than one foot long.....*Honey Locust*

Leaves more than two feet long.....*Hercules Club*

Not thorny.

Leaflets with teeth.....*China-berry Tree*

Leaflets without teeth.

Leaflets one-sided....."*Mimosa*"

Leaflets symmetrical.....*Kentucky Coffee Tree*

### Leaves once-compound.

Odor offensive.....*Tree of Heaven*

Odor not offensive.

Fruit a flat pod.

Branches with short thorns; twigs and leaf-stalks not sticky.....*Black Locust*

Branches with or without short thorns; twigs and leaf-stalks very sticky.....*Clammy Locust*

Branches without thorns; twigs and leaf-stalks not sticky.....*Yellow Wood*

Fruit a small one-seeded capsule; branches prickly; leaves fragrant when bruised.....*Prickly Ash*

Fruit a small red berry; twigs smooth.....*Mountain Ash*

Fruit a small red berry; twigs densely fuzzy....*Staghorn Sumach*

Fruit a nut, hull dividing into four parts when ripe.†

Bark flaky or scaly.‡

Leaves scurfy-hairy; shell of nut thin, hull thick.....*Scaly-bark Hickory*

Leaves smooth.

Hull contracted into a neck at the base...*Pig-nut Hickory*

Hull not contracted into a neck at the base.

Hull of nut thick, shell thin.....*N. C. Scaly-bark*

Hull of nut thin, shell thin.....*Small-fruited Hickory*

Bark not flaky.

Leaflets smooth, broad; nut with a persistent hull and usually with a neck at the base.....*Pig-nut Hickory*

Leaflets hairy, broad; nut with a thick shell.....*White-heart Hickory*

Leaflets with minute silvery or brownish scales below, narrow; hull of nut yellow with minute particles.....*Pale Hickory*

Leaves hairy, leaflets narrow to broad; nut bitter.....*Bitternut*

Leaflets smooth, narrow and numerous; nut bitter, flattened, rough.....*Water Hickory*

\* The Honey Locust may also bear once-compound leaves.

† In the Pig-nut Hickory the hull usually does not split into parts.

‡ In the Small-fruited Hickory the bark is sometimes only obscurely flaky below, but in such cases the upper part of the tree will show this character more clearly.

- Fruit a nut with a green hull that does not split away.
- Hull of nut with sticky hairs.....*Butternut*
- Hull of nut without sticky hairs.....*Black Walnut*
- B. Leaves compound, opposite on the twig.
- Leaflets clustered at the end of the leaf-stalk (palmately compound).....*Buckeye*
- Leaflets not clustered at the end of the leaf-stalk (pinnately compound).
- Leaflets not lobed; fruit simple with an apical wing.
- Fruit averaging 2 inches or more long; a tree of the coastal swamps.....*Pumpkin Ash*
- Fruit less than 2 inches long.
- Wing narrow, linear, extending about half way down the narrow seed.....*Darlington's Ash*
- Wing spatulate, broad, extending about half way down the long narrow seed.
- Twigs and leaf-stalks velvety.....*Red Ash*
- Twigs and leaf-stalks smooth.....*Green Ash*
- Wing broad, extending more than half way down the short plump seed.....*Small's Ash*
- Wing long, narrow, pointed or notched, not extending down the short plump seed.
- Twigs and leaf-stalks smooth.....*White Ash*
- Twigs and leaf-stalks tomentose.....*Biltmore Ash*
- Wing broad, extending all around the seed; a tree of the coastal swamps.....*Water Ash*
- Leaflets, at least some of them, lobed; fruit double, with two wings.....*Ash-leaved Maple*
- C. Leaves simple, alternate on the twig.
- Fruit not an acorn. (For "Fruit an Acorn" see page 13.)
1. Branches thorny
- Edges of leaves not toothed or lobed.....*Osage Orange*
- Edges of leaves with teeth or lobes.
- Fruit  $\frac{3}{4}$  inch or more thick.
- Leaves at least twice as long as broad.....*Narrow-leaved Crab*
- Leaves nearly as broad as long.....*Crab Apple*
- Fruit not  $\frac{3}{4}$  inch thick.
- Leaves three-lobed.
- Leaves about twice as long as broad, acute at base.....*Green Haw*
- Leaves about as broad as long, not acute at base.....*Washington Thorn*
- Leaves deeply cut with more than three lobes.....*Parsley Haw*
- Leaves not deeply lobed.
- Nutlets with cavities on their inner faces.
- Fruits globose.....*Chapman's Thorn*
- Fruits pear-shaped.....*Pear Thorn*
- Nutlets without cavities on their inner faces.
- Leaves about twice as long as broad.
- Leaves small, mostly less than one inch wide.



- Leaves dark shiny green above,  
smooth, toothed on upper half;  
fruit nearly  $\frac{1}{2}$  inch in diameter....*Cock-spur Thorn*
- Leaves as above, but hairy; fruits  
slightly hairy, about  $\frac{3}{8}$  inch in  
diameter.....*Barberry-leaved Haw*
- Leaves similar to above, or three-  
lobed on vigorous shoots, hairy  
when young; fruits about  $\frac{1}{4}$  inch in  
diameter.....*Spatulate Thorn*
- Leaves larger, mostly over an inch wide.
- Leaves dull above; fruits short oblong,  
 $\frac{1}{2}$  inch in length, white dotted.....*Dotted Thorn*
- Leaves dull above, fruits globose,  $\frac{1}{4}$  to  
 $\frac{1}{2}$  inch in diameter, pale dotted....*Chapman's Hill Thorn*
- Leaves shining above, often three-  
lobed; fruits globose,  $\frac{1}{4}$  inch or less  
in diameter. ....*Green Haw*
- Leaves about as broad as long.
- Flower-stalks smooth.
- Leaves half leathery; fruits about  $\frac{1}{2}$   
inch in diameter.....*Boynton's Thorn*
- Leaves thin; fruits about  $\frac{1}{4}$  inch in  
diameter, with a more or less waxy  
bloom.....*Waxy Thorn*
- Flower-stalks hairy.
- Fruit pear-shaped, about  $\frac{1}{2}$  inch long....*Summer Haw*
- Fruit globose,  $\frac{1}{4}$ - $\frac{1}{2}$  inch in diameter,  
marked with dark dots.....*Sunny Thorn*
- Fruits globose, about  $\frac{1}{2}$  inch in diameter,  
not dotted.....*Rough Thorn*
- 2. Branches not thorny.
- a. Edges of leaves not toothed or lobed.
- z Leaves evergreen.
- Leaves averaging less than  $2\frac{1}{2}$  inches  
broad
- Leaves aromatic when bruised.
- Twigs smooth.
- Twigs light green, leaves white  
beneath.....*Sweet Bay*
- Twigs brown, leaves light green  
beneath.....*Smooth Red Bay*
- Twigs hairy.....*Red Bay*
- Leaves not aromatic when bruised.
- Twigs smooth.
- Leaf broadest near the outer  
end.....*He Huckleberry*
- Leaf broadest near the middle....*Laurel Cherry*
- Twigs hairy.
- Leaves over  $3\frac{1}{4}$  inches long.....*Rhododendron*
- Leaves less than  $3\frac{1}{4}$  inches long.
- Twigs sticky when young and  
becoming smooth in latter  
part of season; fruit a  
pod.....*Mountain Laurel*

- Twigs not sticky; leaves often with prickly edges; fruit a berry.....*Dahoon Holly*
- Leaves averaging more than 2½ inches broad.....*Magnolia*
- y Leaves not evergreen.
  - Leaves large, averaging over 5 inches long.
    - Leaves not bad smelling when crushed.
      - Leaves not eared at the base.
        - Over 12 inches long.....*Umbrella Tree*
        - Less than 12 inches long.....*Cucumber Tree*
      - Leaves eared at the base.
        - Over 18 inches long.....*Large-leaved Cucumber*
        - Less than 18 inches long.....*Mountain Magnolia*
    - Leaves bad smelling when crushed..*Pawpaw*
  - Leaves averaging less than 5 inches long.
    - Blade of leaf as broad or nearly as broad as long.....*Redbud*
  - Blade of leaf much longer than broad.
    - Fruit a persimmon.....*Persimmon*
    - Fruit a blue or black berry with large stones.
      - Veins from mid-ribs strongly curving toward tip.....*Blue Dogwood*
      - Veins from mid-rib not strongly curving toward tip.
        - Fruits usually 3 on a common stem.....*Black Gum*
        - Fruits two on a common stem.....*Water Gum*
        - Fruits one to the stem; leaves sometimes toothed.....*Tupelo Gum*
- b. Edges of leaves with teeth or lobes.
  - x Blade of leaf as broad as long or less than twice longer than broad.
    - Blade of leaf broad and notched at the end.....*Tulip Tree, "Poplar"*
  - Blade of leaf pointed at the end.
    - Fruits on a leaf-like bract.
      - Leaf green beneath.....*American Linden*
      - Leaf gray and moderately tomentose beneath with short hairs; bracts mostly abruptly narrowed at the base and under 4 inches long....*White Linden*
      - Leaf silvery and densely covered beneath with short hairs; bracts usually tapering at the base and mostly over 4 inches long.....*Michaux's Linden*
      - Leaf rusty beneath with short hairs..*Downy Linden*
    - Fruits not on a leaf-like bract.
      - Leaves five-lobed, smooth and shining.....*Sweet Gum*



- Leaves large with many irregular lobes and teeth; bark white, flaky.....*Sycamore*
- Not as above.
  - Blade six inches or more long, not lobed.....*Cotton-wood*
  - Blade smaller or deeply lobed.
    - Leaf-stalks not flattened.
      - Leaves smooth on both sides; fruit white.....*White Mulberry*
      - Leaves more or less tomentose below, harsh above; not increasing by suckers.....*Red Mulberry*
      - Leaves densely soft-tomentose below, harsh above; increasing by suckers.....*Paper Mulberry*
    - Leaf-stalks flattened below the blade.
      - Leaves white tomentose beneath.....*White Poplar*
      - Leaves smooth, teeth large, less than 14 on each side...*Large-toothed Poplar* \*
      - Leaves smooth, teeth small, more than 14 on each side.*Carolina Poplar*
- y Blade of leaf much longer than broad.
  - Leaves evergreen, thick and leathery.
    - Edges of leaves prickly.
      - Leaves less than twice as long as broad.....*American Holly*
      - Leaves more than twice as long as broad.....*Dahoon Holly*.
    - Edges of leaves not prickly.
      - Leaves averaging less than 2 inches long.....*Yopon Holly*.
      - Leaves averaging more than 2 inches long.
        - Fruit a red berry.....*Dahoon Holly*
        - Fruit a silky pod.....*Loblolly Bay*
  - Leaves not evergreen.
    - Teeth of leaves with bristle tips.
      - Leaves white tomentose beneath...*Chinquapin*
      - Leaves not tomentose beneath....*Chestnut*
    - Teeth of leaves not bristle tipped.
      - Leaves over 5 times as long as broad.
        - Branchlets drooping.....*Weeping Willow*
        - Branchlets not strongly drooping.
          - Leaves green beneath.....*Black Willow*
          - Leaves whitish beneath.....*Ward's Willow*\*
      - Leaves less than 5 times as long as broad.

\* The leaves of the Silky Willow, which is only a shrub, are also whitish beneath and must not be confused with this.

- Leaves with conspicuous parallel veins from the mid-rib to the edge.
  - Bark smooth or with only slight furrows and cracks.
    - Leaf margin undulate.....*Witch Hazel*
    - Leaf margin smooth or minutely toothed.....*Buckthorn*
    - Leaf margin distinctly toothed.
      - Bark whitish, trunk without ridges.....*Beech*
      - Bark very dark, trunk with ridges.....*Hornbeam*
  - Bark quite rough or papery.
    - Leaves and young bark with odor of wintergreen.
      - Bark whitish, peeling off in papery layers.....*Yellow Birch*
      - Bark not white or papery..*Cherry Birch*
    - Leaves and bark not aromatic.
      - Bark falling away in papery layers, brownish.*River Birch*
      - Bark rough-scurfy; fruit a cluster of hop-like bracts.....*Hop-Hornbeam*
      - Bark rough; fruit small, flat, winged.
        - Leaves averaging less than 2½ inches long..*Winged Elm*
        - Leaves averaging more than 2½ inches long.
          - Soft velvety below, rough above; buds covered with brown fuzz, wing of fruit not hairy..*Slippery Elm*
          - Smooth or nearly so above, smooth or tomentose below; buds smooth; wing of fruit hairy.....*White Elm*
  - Leaves without conspicuous parallel veins from the mid-rib to the edge.
    - Leaves without teeth; generally, but not always lobed; aromatic.....*Sassafras*
    - Leaves toothed but not lobed.
      - Leaves distinctly sour to the taste.....*Sourwood*
      - Leaves distinctly sweet to the taste.....*Horse Sugar*



Leaves not distinctly sour or sweet.

Leaves with coarse teeth  
like a saw, ovate-lanceolate; bark with  
thick, corky warts.....*Hackberry*

Leaves oval, downy  
below; fruit four-winged.....*Snowdrop Tree*

Leaves ovate to obovate,  
rather abruptly pointed; fruit a bitterish  
plum.....*Wild Plum*

Leaves long-lanceolate;  
fruit a sweet plum....*Chickasaw Plum*

Leaves oblong-lanceolate,  
about 3 times longer  
than broad; fruit a  
small red cherry.....*Wild Red Cherry*

Leaves oval to lanceolate,  
about twice longer  
than broad; fruit a  
small black cherry....*Choke Cherry*

Leaves obovate-lanceolate, less than an inch  
broad; fruit a small  
red berry.....*Deciduous Holly*

Leaves ovate-lanceolate,  
with a long point,  
more than  $1\frac{1}{2}$  inches  
broad; fruit a small  
red berry..... *Mountain Holly*

Leaves small, ovate,  
shiny, thick, with  
minute teeth on the  
turned under edges;  
fruit small, black... *Sparkleberry*

Leaves ovate, tapering to  
a point, bronze when  
young, smooth beneath at maturity,  
teeth small and very  
close; fruit small, reddish.....*Shad-bush*

As above, but leaves tomentose at maturity  
and not bronze when  
young.....*Swamp Shad-bush*

Fruit an acorn.

Leaves broadest at the ends.

Two to three inches long.....*Water Oak*

Four to six inches long.....*Black Jack Oak*

- Leaves broadest in the middle.
- Leaves usually without lobes.
- Leaves evergreen.
  - Leaves white-tomentose beneath, leathery..*Live Oak*
  - Leaves smooth beneath.....*Laurel Oak*
- Leaves not evergreen.
  - Smooth and shining on both sides.....*Willow Oak*
  - Tomentose beneath, averaging over an inch wide.....*Shingle Oak*
  - White tomentose beneath, rarely an inch wide.....*Upland Willow Oak*
- Leaves with lobes.
  - Lobes not bristle tipped.
  - Lobes less than ten.
    - Lobes rounded, cup of acorn low.
      - Leaves with seven or nine regular lobes, whitish beneath.
      - Acorns on short stalks.....*White Oak*
      - Acorns on long stalks.....*Swamp White Oak*
    - Leaves with five to seven deep, irregular, rounded lobes, gray-green beneath.
      - Leaves averaging under 3 inches long..*Scrubby Post Oak*
      - Leaves averaging over 3 inches long..*Post Oak*
  - Lobes pointed, cup almost covering acorn.....*Overcup Oak*
- More than 15 shallow lobes.
  - Acorn an inch or more long.
    - Upland tree.....*Rock Chestnut Oak*
    - Low-ground tree.....*Swamp Chestnut Oak*
  - Acorn less than  $\frac{1}{2}$  inch long.....*Yellow Chestnut Oak*
- Lobes bristle tipped.
  - Mature leaves green on both sides.
    - Cup of acorn very low.
      - Lobes of leaf shallow, acorn large..*Red Oak*
      - Lobes of leaf deep, acorn about  $\frac{1}{2}$  inch long.....*Pin Oak*
      - Lobes of leaf deep; acorn more than  $\frac{1}{2}$  inch long.....*Swamp Red Oak*
    - Cup of acorn deep, about half the length of the acorn.
      - Leaf-stalk less than an inch long.....*Turkey Oak*
    - Leaf-stalk more than an inch long.
      - Edge of cup usually inrolled, scales tightly pressed together; leaves smooth and shining on both sides.....*Scarlet Oak*
      - Edge of cup not inrolled, scales loosely pressed together; leaves dark green, under side yellow-scurfy when young, but becoming smooth.....*Black Oak*
  - Mature leaves densely tomentose beneath.

- Upland tree; leaf usually with a long central lobe, base of leaf rounded.....*Spanish Oak*
  - Low-ground tree; base of leaf pointed.....*Swamp Spanish Oak*
- D. Leaves simple, opposite on the twig.**
  - a. Edges of leaf not toothed or lobed.**
    - Leaves heart-shaped, large.
      - Fruit a short, ovate pod.....*Paulownia*
      - Fruit a long, slender pod.....*Catalpa*
    - Leaves not heart-shaped.
      - Leaves with minute white hairs on both sides; each group of small, yellow flowers surrounded by four white, petal-like leaves.....*Dogwood*
      - Leaves without hairs on the upper side; flowers in loose, drooping clusters, fragrant, petals long and narrow.....*Fringe Tree*
      - Leaves without hairs on the upper side; flowers in broad, erect clusters, petals short.....*Withe Rod*
      - Leaves without hairs, evergreen; flowers in axillary clusters, fragrant.....*Devil-wood*
  - b Edges of leaves with teeth or lobes.**
    - Leaves not lobed, toothed.
      - Peduncles (common stalks of the fruit and flower clusters)  $\frac{1}{2}$  inch or more long.....*Withe Rod*
      - Peduncles less than  $\frac{1}{2}$  inch long.
        - Twigs and leaf-stalks smooth.....*Black Haw*
        - Twigs and leaf-stalks sparingly red-hairy or scurfy (scaly), mountain tree.....*Nanny Berry*
        - Twigs and leaf-stalks covered with red plush, middle and eastern tree.....*Blue Haw*
    - Leaves lobed and strongly toothed.
      - Small trees of the high mountains; fruit in terminal racemes.
        - Bark striped with whitish lines.....*Striped Maple*
        - Bark not striped with whitish lines.....*Mountain Maple*
      - Small shrub or tree of the Piedmont; bark very white; leaves not whitish beneath...*White-barked Sugar Maple*
      - Larger trees; fruits in lateral clusters.
        - Leaves deeply lobed more than half way to the middle, coarsely toothed, silvery white below.....*Silver Maple*
        - Leaves with 3-5 lobes which extend less than half way to the middle, many teeth, whitish below; fruit red.
          - Leaves small, three-lobed, tomentose below.....*Carolina Red Maple*
          - Leaves larger, 3-5 lobed, smooth below...*Red Maple*
        - Leaves with 3-5 strong lobes, which have only 2-4 teeth or none.
          - Leaves whitish, smooth beneath.....*Sugar Maple*
          - Leaves whitish, tomentose beneath....*Southern Sugar Maple*
          - Leaves green beneath, lobes scarcely toothed.....*Black Maple*



## SIMPLE PRINCIPLES OF DESIGN AND PLANTING

### Foundation Planting

Soften the outline of the buildings and relate them to the lawn by placing shrubs in angles and here and there along the sides. If only one sort is used in a place it should be a kind that branches outward from the base as it bends over and touches the ground. Among the best of these are *Van Houtte's* and *Thunberg's spireas*, *winter jessamine*, *forsythias*, *Thunberg's barberry*, *oak-leaved hydrangea*, the *deutsias*, and such evergreens as *arbor-vitae*, *yew*, *box*, *holly-leaved olive*, *sweet olive*, *pittosporum*, and *yojon*. Taller sorts that tend to become bare below should be planted behind others that are lower and reach the grass. Many native wild shrubs that flourish in the vicinity can be used with fine effect if sensibly chosen and placed.

### Walks and Drives

Run the walks and drives where most needed, but try to keep them near the buildings and around the borders. Do not put them directly against a building or fence, but leave a space about three feet to seven feet wide for a grass and shrub border. Grounds that are cut up by a multitude of small trails have lost a large part of their beauty. If the walks decided on as the fewest number possible are made quite adequate in breadth, clearly laid off and surfaced with gravel, and bordered by a row of stones or bricks, or by gutters of the same, it will be much easier to keep people off the grass than where carelessly laid and poorly defined walks tempt one to ignore them. Where curves or angles offer a strong temptation to cut across the grass to save a little distance, about the only practical deterrent is to place a group of shrubs along the critical points, and the more formidable these are the better. If *trifoliate orange*, *Japan quince*, or strong-growing *roses*, such

as *McCartney*, *prairie* or *rugosa*, are used they will stop even the most venturesome with their thorns. Do not try to avoid straight walks where they are more convenient, especially when there are other straight lines near, such as by boundaries of the property or near the buildings. A straight line is no more unnatural than a curved one, though it is rarer. All depends on circumstances. A curved walk or drive through open country or lawns or through woods is much more pleasing and natural-looking than a straight one, and on uneven ground a straight walk would offend all ideas of fitness and harmony. On the other hand, nothing is more pleasing than a long, straight walk bordered with shrubbery or arched with trees, leading with obvious purpose to some distant objective or vista. The formal garden near the house with its straight lines and symmetrical arches and curves is a recognized unit of artistic design, and when properly connected with other features in no way interferes with the natural treatment of other sections of the grounds.

### Open Spaces

Keep the lawn area open in large part and group the trees in the background around the margins, with shrubs and flowers in front of them in such amount as conditions allow. The choice and arrangement of these plants will show results in proportion to the skill and experience of the designer. If the available grounds must be divided into more than one section, as is usually the case, they should be connected if possible by as broad a lawn strip as space allows, and this should be left open so as to give an unobstructed view of the entire distance. This will afford pleasing vistas and a sense of spaciousness not possible in a number of separated, smaller areas.

### Making the Lawn

A really good lawn is expensive to make and to keep, but a respectable grassy area can be had for very little cost. For the least possible outlay proceed as follows: see that the soil

is well drained and all rocks, stumps and trash are removed; plough deeply, and if the surface is irregular with ridges and sinks use a drag to produce a level surface or an even slope. Make the ground as rich as you can afford with stable manure, cottonseed meal, or commercial fertilizer. Harrow with a disc harrow until the ground is well pulverized then follow with finer harrows to smooth. Sow the grass and cover with a cedar top or a very fine harrow. In the coastal plain the most practical grass is *Bermuda*, which may be planted by scattering and covering up the chopped-up runners. In the middle and western sections use a mixture of equal parts *Kentucky blue grass*, *creeping bent grass*, *sheep fescue*, and *perennial rye grass* and plant at the rate of a hundred pounds per acre in fall or early spring. It is absolutely necessary to use a lawn mower often if the lawn is to be at all presentable, and watering in dry seasons will be a great help. For more detail as to lawn making and the eradicating of weeds see an article by Coker in the *Journal Elisha Mitchell Scientific Society* 31: 162. 1915.

### Boundary Planting

It is usually best to outline the entire property by a distinct boundary mark of some kind, preferably a stone wall or a hedge, and not to have this easily penetrated except at certain entrances. This will greatly lessen the danger of destructive invasion by thoughtless people or wilful marauders.

### Distant Views

If distant objects of beauty can be seen from the grounds, as mountains, valleys, rivers or ocean, the planting should be so ordered as to leave these unobstructed and to accentuate them as much as possible by a framework of trees. If it is possible to have the trees arch over these distant views it will add a wonderful charm to the picture. It is equally obvious that all ugly sights, such as outbuildings, back yards of neighbors (unless they are kept better than most), dump heaps, etc., should be hidden by appropriate plantings.





Showing how to transplant a tree



### What to Plant

It is best to use our own native trees, shrubs and flowers, to as great an extent as is consistent with expediency and common sense. As in designing, so in planting material, there have been and still are contending "schools." The naturalistic school has now largely replaced the older formalism in design and this has carried with it a similar "natural" tendency in the selection of the plants to be used. It is well to avoid the extremes of any tendency and to savor dogmas with common sense. There are those who carry the naturalistic in planting so far as to insist on the use of only such plants as grow wild in the immediate vicinity. A garden so planted might be a good hobby for a few people so inclined, and could be made very beautiful. It could not be made, however, without far more labor, thought and knowledge than is usually available or would be necessary under a less rigid conception. It should not be forgotten that the exotic plants that are most used in our gardens have won their way there by very superior qualities that have stood the most exacting test of years. In hardihood, adaptability and staying power they have proved themselves superior to many of our native plants that might be more beautiful or picturesque if all their exacting requirements were met.

In the case of trees, there is far less reason for the use of exotics than with shrubs and flowers. Our state is so rich in trees of every form and size that there is little need of our going outside of our natural wealth. We cannot find anything for this climate that can equal a large number of our own species for permanence, size, and beauty, and it should be the rule to use our natives in the great mass of our plantings. Even here, however, it would be foolish to exclude such exotics as *crepe myrtle* and *mimosa* that fill so admirably the special needs that nothing we have can quite supply.

A few more words are necessary here to avoid a wrong impression. While there are many of our native flowers that have already become recognized as most desirable ornamentals,



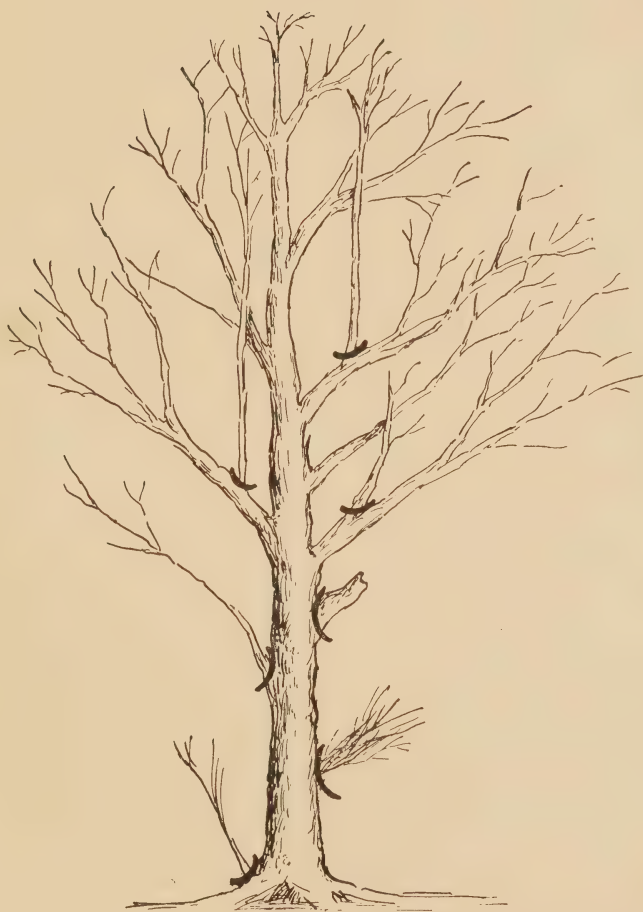
there are also many others that have not yet been given a fair chance to show what they can do with a little encouragement from man. We have in the past shamefully neglected our opportunity to test, select, breed and improve them. Most of the best things we have from abroad are horticultural forms that have been selected from many variations and are the result of long years of conscious effort to improve. Many a gem in the woods at our very door is only awaiting a little digging and polishing to be worthy to take its place among the ornaments of any garden.

### Regional Differences

From the evidences of its plant life, the climate of North Carolina, from Smith Island to the mountain summits, exhibits about the same differences as that shown between northern Florida and Labrador. Over such a wide range of conditions it is impossible for us to give detailed advice in garden and horticultural practice, and a distinct modicum of common sense must be infused into the reading of this sketchy bulletin if the best results are to be expected. As the old dorky said who had sold a mule and was asked how he should be handled: "Dat depens on which en ob de mule you talkin' bout." We have tried throughout to indicate the regions most suited to the plants mentioned, but much that is said must be taken as not applicable to extreme cases.

Of unique interest is the subtropical vegetation of the southeastern coastal strip, including most of Brunswick, New Hanover and Onslow counties. Large palmettos grow in abundance on Smith Island and may be used as far inland as Wilmington, though subject there to some injury in the most severe winters. The great magnolia, American olive, yopon and Spanish bayonet are also native to this strip, and such fine and semi-tender exotics as oleander, tea, loquat, camellia, gardenia, pittosporum, and the camphor tree are hardy there. These last, indeed, are very rarely cold-killed as far west as Fayetteville.

PLATE 3



Shewing how to prune a tree





The higher mountain tops, while of intense interest botanically, do not support habitations and need not detain us here. But our large *mountain region* of moderate altitude (1800-4000 feet) is so wonderfully adapted to beautiful evergreens, as *spruces*, *firs*, *hemlocks*, and those magnificent members of the heath family as *rhododendrons*, *kalmias*, *azaleas*, etc., that no one there need go away from home to find things fit for the most ambitious estate. In fact, there is no similar group of shrubs in the world that can surpass our North Carolina natives of the heath family. There are so many other beautiful shrubs in the mountains to supplement these that one is tempted to go on and on in their praise. There are between 150 and 160 species of shrubs in our mountains, many of which could be easily cultivated in their own region. A few of the most conspicuous are (besides the above) *sweet fern*, *yellow root*, *sweet shrub*, *syringas*, *hydrangeas*, *spireas*, *red haws*, *locusts*, *sumachs*, *huckleberries* and *viburnums*. (See p. 32 for condensed lists of plants best suited to each section.)

### Select the Strong and Hardy

Use only plants that are vigorous and quite hardy in your neighborhood, that is, unless you have both time and inclination to meet the exacting needs of more tender and helpless things. We could easily have added hundreds of species to those actually used in our plans in this pamphlet or recommended as desirable, but we have rigidly excluded all that cannot succeed with the minimum of attention. Others we have excluded for no reason except lack of space. It may be said there is not a native tree or shrub in the state that could not be used to advantage under suitable conditions.

### Mass Planting

As a rule it is best to use several plants of the same kind together, or in ample grounds even a large number, so that more effect and more repose can be secured. The extent of each shrub mass should be determined by some natural limit,

such as angles, bays, tops of knolls, or areas between larger plantings. In the absence of such natural limits separate masses should not terminate abruptly, but should intermix gradually at the points of contact. In long curves trees should be brought forward to break the shrub borders here and there and give a natural appearance to the mass divisions. A modified form of mass planting, and one having many attractions, is the mixing of two or three sorts of shrubs (or herbs) in numbers and in a varied proportion to assume a natural aspect. The most common and usually the most satisfactory combination of masses is that of two species of unequal height, the taller behind the other, and of a sort in which the flowers harmonize in color and bloom at the same time, such as *Japan quince* and *Thunberg's spirea*. Mass planting should not be made a dogma, however. There is an interest of its own in a walk bordered by many kinds of shrubs in intricate mixture, especially if these shrubs are close to the walk and are clipped like a hedge on the walk side.

In places of moderate size it is hardly possible to use trees of one kind in large masses, but in most school grounds *pin*es, *cedars* and other evergreens can often be grouped in numbers in the angles or along the boundaries.

### Transplanting from the Woods

Nearly all the native trees that we ourselves use are taken directly from the woods. More care is needed to do this with success than to handle trees from nurseries, but not only is the item of cost a large one when commercial trees are used, but there are also a number of fine native species that are not offered for sale by nurseries in this part of the country. There is nearly always some well known character in a community who thinks he knows how to transplant forest trees, but it is very rare when any of these individuals can accomplish this without much butchery and great loss. The greatest sources of loss are selecting too large specimens, cutting the roots too close, and leaving on too many branches. It is much better

to select small trees, i.e., about one inch thick, which will grow off nicely, than to select larger ones which will struggle painfully for years before becoming established. The principal roots should be followed out with a mattock or a spade for two or three feet from the tree before cutting, and every effort should be made to keep some of the earth attached to the roots.

### **How to Plant**

The following practice should be followed in setting the plants. Never let the roots dry out. Set the trees about 2 inches deeper than they stood before, putting the best soil around the roots and packing very firmly before the hole is quite full. Add other loose earth nearly to fill the hole and do not pack. Finally, put another shovelful or two of good manure on top and let stand. If the soil is not very rich, good, well rotted manure should be mixed with all the soil put into the hole. If the ground is rich the holes need not be larger than is necessary to allow the roots to spread out well; if poor the holes should be larger and plenty of manure or rich earth used in planting. The roots of course should be well spread out in the hole, and if they are complicated the earth should be carefully pressed between them with the fingers as it is thrown in, so as to have it firmly compacted about all the roots. All broken and wounded roots should be cut off above the injured place by a pair of sharp pruning shears. In planting trees drive a six or seven foot pole near the plant before the roots are covered, and after planting tie the stem with strips of cloth or wire run through old garden hose.

### **Cutting Back**

Except in case of evergreens received from nurseries with a ball of earth wrapped around the roots, or of herbs that can be lifted in the shovel without disturbing the roots, all plants should be strongly cut back when planted. For those who

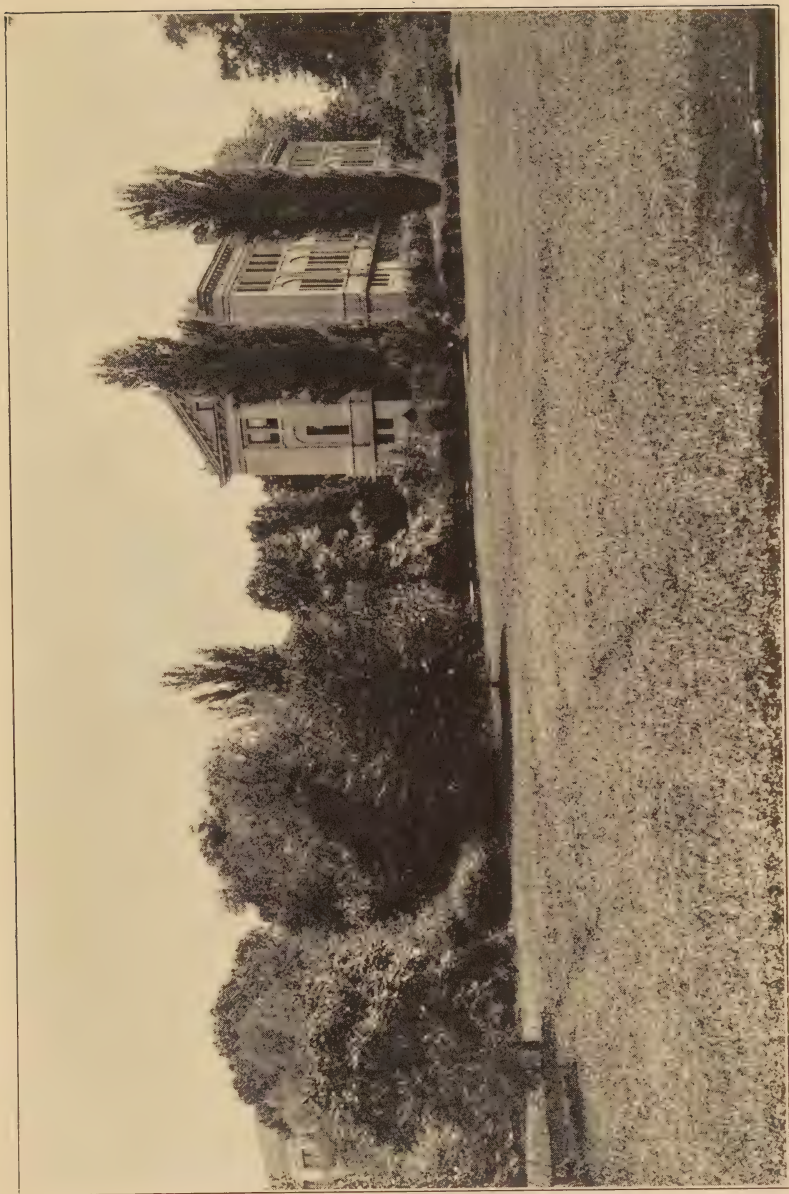


are without detailed knowledge of practice it is best to make a general rule to cut back all trees to a single stem and to cut off this stem one or two feet from the top. In this case, as in all subsequent trimming, all branches should be cut even with the stem without any stub. Shrubs should have all the stems shortened back about half way and dead or imperfect parts removed. Broad-leaved evergreens such as *magnolias*, *photinias*, *camellias*, and *hollies*, if received with a ball of earth should have all or nearly all the leaves removed and the branches shortened back about half. If received without a ball of earth, or if taken from the woods, they should be trimmed to a simple stem and the top cut off, as in the case of deciduous trees, all leaves being removed from the stem.

#### After Care

The proper care of the plants after setting out is at least as important as a right start, and it is to the absence of such care that most failures are due. Struggling against grass and weeds for water, fertilizer, and sun it is no wonder that many shrubs are smaller after a year or two than they were at the start. Starved and neglected, they have about as much chance to perfect themselves as does a child in a slum tenement. Before entering on any plans for improving the grounds, the expense and labor involved in the subsequent care should be thoroughly realized and arranged for. Where children are about and not well controlled it is absolutely necessary to protect all planting from their ruinous play and trampling at dangerous points. Beds should be distinctly outlined with rocks, bricks or planks, and it is best to use thorny plants in critical places. It is well to remember, though, that plants should not be put in places where they would unduly crowd or inconvenience the children. Think first where the plants have a right to go and then thoroughly protect them.

During the first summer all plants should be watched carefully and watered when necessary. Some will require little or no water; others will need several thorough waterings



ARBORETUM OF UNIVERSITY OF NORTH CAROLINA

Lombardy poplars by Davie Hall; beech near center; varnish tree at left





during severe droughts. It is especially necessary to water all evergreens and such trees as oaks, hickories and pecans during the first summer. After that it is only in severe droughts that water will be needed to preserve life, but watering will always repay the trouble in the increased growth and beauty. All weeds and grass should be kept away from the plants for several years, or until they are thoroughly established and can keep down these enemies with their shade. Around individual trees a circle three or more feet across should be kept worked and fertilized for several years. It will be of great benefit in retaining moisture and discouraging weeds if the cut grass is raked up and put around the trees and shrubs as a mulch.

### Pruning

The barbarous practice of topping large trees, so prevalent in our section, should never be thought of. The result is to destroy the beauty of the tree and to shorten its life by many years. If trees are too close together and begin to crowd each other, or make too dense a shade, some should be cut out, not all topped. By a proper choice of plants the subsequent care can be reduced to a minimum, but there will always be a certain amount of pruning necessary. A strong knife, pruning shears and a saw are the only implements necessary to keep trees, shrubs and hedges in order. Trees should have their broken and useless branches removed close to the trunks so that no stub is left. If two or more uprights try to form, all but one should be removed; useless branches that crowd others should be cut off, as well as water-shoots and suckers from the branches or roots. Shrubs that tend to become too thin or straggly or too large for their place should be sheared back all around, or where needed. Tall open growers like *roses*, *weigelas*, *altheas*, *hydrangeas*, and *yopon* are particularly in need of an annual shortening back. All dead or unhealthy shoots should be cut out. Those shrubs that bloom on the old wood in early spring, such as *spireas*, *forsythias*, *weigelas*, *quinces*,

etc., should be pruned immediately after flowering, others that bloom on the new wood such as *hydrangeas*, *roses*, *altheas*, *sumachs*, *smoke bush*, *chaste tree*, etc., may be pruned at any time that the leaves are off. Some pruning with the leaves on will not hurt.

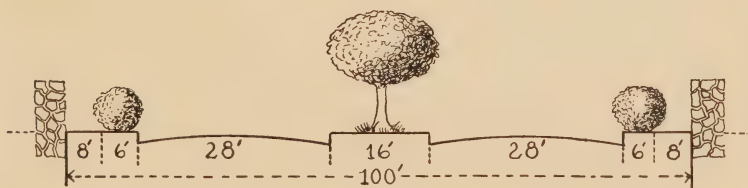
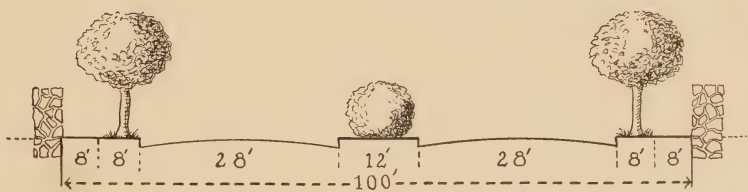
### Rhododendrons and Azaleas

*Rhododendrons*, *azaleas*, *kalmias*, and other members of the heath family require a special word as to treatment. They will grow well if adapted and will fully repay all necessary trouble, but there are certain conditions that they demand. They do particularly well in the mountains, principally because of the greater prevalence of moist and well drained soil, but *R. catawbiense* and its hybrids can be made to succeed well all the way to the coast. It is not generally known that *R. catawbiense*, which is usually supposed to be confined to the high mountains, is found wild in robust condition at Chapel Hill and even as far east as Selma on the coastal plain (see *Journal E. Mitchell Sci. Soc.* 35: 76. 1919). The plants require a moist, but well drained soil containing humus, absence of lime, some shade (particularly in the afternoon) and a mulch of rotting leaves or straw, the thicker the better. If the conditions are not already suitable, which they rarely are outside of the mountains, the soil should be dug out for a depth of  $2\frac{1}{2}$  feet over the whole bed to be used, and the hole refilled by putting stones or bricks or coarse gravel in the bottom of a half foot deep, and filling up with good loose soil mixed with plenty of leaf mold and some well rotted manure. After planting and watering, the mulch of rotting leaves should be put on at once.

### Long Leaf Pine

The *long-leaf pine* and to a less extent other pines are difficult to transplant and also require a word. The difficulty is due to the long, large tap root and absence of superficial rootlets. One should look for young pines one or two feet high

# PLATE 5







that are growing near the margins of bays. Where the ground is wet a little below the surface it will be found that superficial spreading roots have been formed instead of a tap root. If a spade is plunged in all the way around the tree about a foot and a half away from it, and no lifting done until the circular cut is finished, it will often be possible to lift the tree out with a large slab of earth holding to the roots, and by careful handling this may be got into the prepared hole without falling away. Broom sedge or other grass, if growing around the pines, will help to hold the soil to the roots.

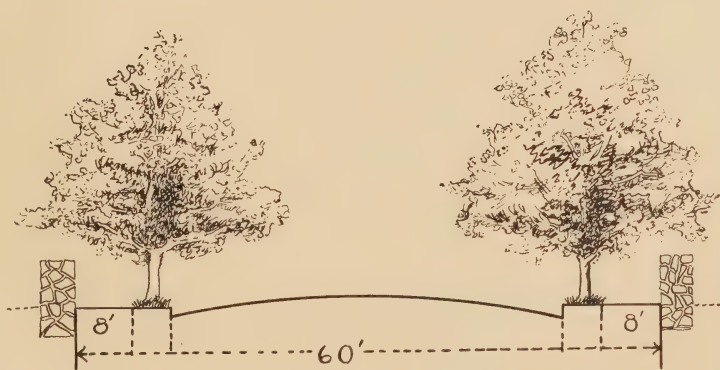
Mr. Lionel Weil of Goldsboro, N. C., has perfected and patented a metal tub for the removal of long leaf pines and other difficult subjects. By the use of this apparatus, which can be obtained from him, one can transplant pines with a very small percentage of loss.

## STREET AND ROADSIDE PLANTING

### Streets

The problem of street planting is complicated by the great variation in the width and use of streets and the presence or absence of pavement. There are narrow, busy streets in some cities where planting of any kind is practically impossible. There are, however, few cities in North Carolina where at least a few trees cannot be planted on every block. Even in New York City it is surprising how rarely one can look around without seeing a few trees. In the average North Carolina town the streets are of several widths. It is usually best to treat the wide streets as shown on the lower figure of plate 6, where a grass strip is left on each side of the street next the sidewalks and the trees planted in these areas. In streets of still greater width, such as are usually called avenues, it is possible to have a central grass strip in which trees or shrubbery may be planted, and in addition the grass strips along the sidewalks planted as usual with trees, or, if the central row is planted in trees, shrubs or small flowering trees may be used on the side strips. For narrow streets the treatment shown in the upper figure of plate 6 is recommended, with a grass strip on only one side where the trees are planted. If the street runs east and west this strip should be on the south side; if north and south it should be on the west side. Larger shade trees, if of the varieties we recommend, should not be planted less than 40 feet apart on any street. Between these, however, it is a good plan to plant smaller flowering trees or shrubs, as shown on plate 7. On any one street, at least for considerable distances, it is best to use one kind of tree, as this gives a more pleasing effect. Variety may be obtained by planting other trees on other streets. What has been said above refers principally to residential sections; for business blocks, if the street is as much as 50 feet wide between side-

PLATE 6







walks, it should be possible in most cases to plant a central row of trees down a grass strip 10 feet or more wide, depending on the amount of traffic. This central strip need not be continuous the whole length of the block, but may consist of units with rounded ends, so that crossing may be possible at frequent intervals. In extreme cases each tree could be given its own rectangular or oval space surrounded by curbing for protection, as should be the case in all street planting. It is most unfortunate that so few of our towns have had the planning to allow for the attractive use of trees, as there is no one item in town beautification that gives so great a return in public appreciation and legitimate advertising.

As mentioned above, the width and use of a street has much to do with the kind of tree best adapted for its planting. On wide streets, where large trees are not out of place, there is no tree in America so desirable in every respect as the American Elm, but it is to be carefully noted that on streets with sewers these must be of iron with carefully cemented joints, else the pipes will be filled with the elm roots. In the plan shown at bottom of plate 5, elms would be beautifully adapted for planting the central strip and on the side strips in the figure above. They could also be used in both plans shown on plate 6. Almost any of the large trees described and illustrated in this bulletin might be used where ample space and fertile soil are available, but we give below a short list of those which we think most useful for this purpose. See p. 32 for the section or sections of the state to which each of the following is best adapted.

Willow Oak  
Laurel Oak  
White Oak  
Spanish or Southern Red Oak  
Pin Oak  
Red Oak  
Tulip Poplar

White Ash  
Green or Red Ash  
Sugar Maple  
Sweet Gum  
Black Gum  
Hackberry or Sugarberry

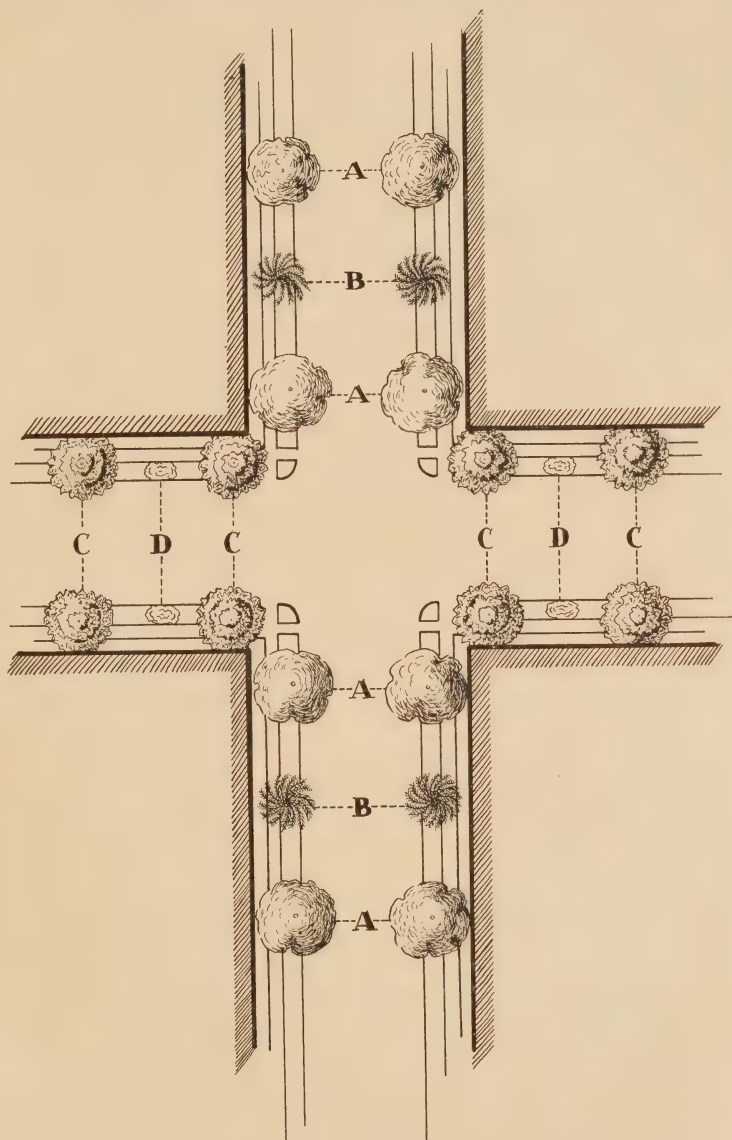
Smaller trees for planting between larger ones or on very narrow streets are:

Mimosa	Yellow Wood
Crepe Myrtle	Hawthorns
Dogwood	Silver Bell
Redbud	Honey Locust
Sassafras	Japanese Flowering Cherry

### Roadsides

Our state is now progressing rapidly toward an appreciation of roadside decoration with trees, and in the next few years will probably see a great extension in this kind of improvement. The easiest way in most cases to get good results is to retain trees already in place when the roads are built, selecting the best and healthiest individuals. It is a very common and very bad practice to cut down all the trees on a place along our highways as soon as the farms are broken up into smaller lots and sold. The public will be fortunate to have the trees along the borders restored within a period of fifty years. If interested organizations would take the trouble to have all the property owners along a road talked to on this subject, we believe a great improvement would be shown at once. The question of roadside planting has fewer complications than that of street planting and usually requires different treatment. The avenue effect produced by planting the same kind of tree on both sides of the road is rarely desirable except for certain straight sections. The natural effect is best and can be obtained by practically duplicating the vegetation of the country through which the road passes. Low places may be planted in willows, cypress, sweet gum, black gum, hackberry, etc., and other types of soil treated on the same principle, planting only what naturally grows there. Many people are now advocating the planting of nut trees or fruit trees along highways. This would seem a pleasant and sociable thing to do, but certain disadvantages should not be forgotten. The most important of these is

PLATE 7



- A - Sweet Gum
- B - Mimosa
- C - Oak (Willow, Laurel, or Pin)
- D - Wax Myrtle or Crepe Myrtle





the attraction of small children close to or on the traffic ways, to their own danger and to the annoyance of travellers. Nuts falling on the roads are objectionable, as are also the sticks and rocks thrown by the children.

## WHAT TO PLANT IN EACH SECTION OF THE STATE

We give below a short list of the plants we consider the most desirable and easily obtainable for each section of the state. The word native here means that they are native to that section of the state in which they are listed. Others, often equally as good, are given in the longer lists that follow. We have not added deciduous shrubs to the short special lists, because so many of them are good throughout nearly the whole state. The longer descriptive lists that follow will give scientific names and short descriptions and will warn against plants unfitted for certain sections.

### Eastern Section

#### *Broad-leaved Evergreen Trees*

Magnolia—Native	Mock Orange—Native
Live Oak—Native	Japanese Oak
Holly—Native	Photinia
American Olive—Native	
For the warmer coastal strip the following might be added:	
Loquat	Palmetto—Native
Camphor	

#### *Coniferous Evergreens*

Long-leaf Pine—Native	Incense Cedar
Short-leaf Pine—Native	American Arbor-vitæ
Loblolly Pine—Native	Oriental Arbor-vitæ
Red Cedar—Native	Cunninghamia lanceolata
Norway Spruce	Cryptomeria japonica
Deodara Cedar	Fortune's Yew

#### *Deciduous Trees*

Cypress—Native	Willow Oak—Native
Black Willow—Native	Laurel Oak—Native
Black Walnut—Native	White Elm—Native
White-heart Hickory	Hackberry—Native
and others—Native	Sweet Bay—Native
Red Birch—Native	Tulip Tree—Native

*Deciduous Trees—Continued*

Beech—Native	Sweet Gum—Native
White Oak—Native	Honey Locust—Native
Scarlet Oak—Native	Ash-leaved Maple—Native
Kentucky Coffee Tree	Mimosa
Ginkgo	Crepe Myrtle
White Willow	Japanese Cherry
Yellow Willow	Redbud—Native
Weeping Willow	Red Maple—Native
Bay Willow	Dogwood—Native
Pecan	Black Gum—Native
Soulangé's Magnolia	White Ash—Native

*Evergreen Shrubs and Canes*

Dwarf Palmetto—Native	Oleander
Wax Myrtle—Native	Mahonia japonica
Yopon—Native	Camellia japonica
Gallberry—Native	Gardenia
Yuccas—Native	Tea
Sweet Olive	Viburnum tinus
Holly-leaved Olive	Viburnum rhytidophyllum
Banana Shrub	Lonicera nitida
Japanese Laurel	Nandina
Quihoui Privet	Rosemary
Abelia grandiflora	Lavender
(partially evergreen)	Bamboos
Pittosporum	

**Middle Section***Broad-leaved Evergreen Trees*

Magnolia—Native	Photinia
Holly—Native	

*Coniferous Evergreens*

Loblolly Pine—Native	Nordman's Fir
Oldfield Pine—Native	American Arbor-vitæ
Jersey Pine—Native	Oriental Arbor-vitæ
Red Cedar—Native	Chinese Juniper
Hemlock—Native	Cedrus atlantica
Norway Spruce	Deodara Cedar
Colorado Spruce	Incense Cedar
Oriental Spruce	Cunninghamia lanceolata
White Fir	Cryptomeria japonica
Douglas Fir	Japanese Yew

*Deciduous Trees*

Cypress—Native	Black Walnut—Native
Black Willow—Native	Red Birch—Native
White-heart Hickory and others—Native	Beech—Native
Scarlet Oak—Native	White Oak—Native
Willow Oak—Native	Red Oak—Native
Pin Oak—Native	White Ash—Native
White Elm—Native	Mimosa
Ash-leaved Maple—Native	Crepe Myrtle
Ginkgo	Kentucky Coffee Tree
White Willow	Black Locust
Yellow Willow	Japanese Cherry
Weeping Willow	Laurel Oak
Bay Willow	Hackberry—Native
Soulanges's Magnolia	Tulip Tree—Native
Buckeye—Native	Sweet Gum—Native
Linden—Native	Honey Locust—Native
Dogwood—Native	Redbud—Native
Black Gum—Native	Red Maple—Native
Sourwood—Native	Sugar Maple—Native

*Evergreen Shrubs and Canes*

Rhododendrons—Native	Japanese Holly
Kalmias—Native	Sweet Olive
Yuccas—Native	Holly-leaved Olive
Pittosporum	Viburnum rhytidophyllum
Mahonia japonica	Lonicera nitida
Quihou Privet	Nandina
Abelia grandiflora (partially evergreen)	Rosemary
Yopon	Lavender
	Bamboos

**Western Section***Broad-leaved Evergreen Trees*

Holly—Native

*Coniferous Trees*

White Pine—Native	Douglas Fir
Short-leaf Pine—Native	Norway Spruce
Mountain Pine—Native	Colorado Spruce
Jersey Pine—Native	Oriental Spruce



*Coniferous Trees—Continued*

White Spruce—Native	American Arbor-vitæ
Black Spruce—Native	Oriental Arbor-vitæ
Red Cedar—Native	Chinese Juniper
Hemlock—Native	Incense Cedar
Carolina Hemlock—Native	Cunninghamia
Fraser's Fir—Native	Japanese Yew
Nordman's Fir	

*Deciduous Trees*

Black Willow—Native	Sugar Maple—Native
Large-leaved Poplar—Native	Red Maple—Native
Black Walnut—Native	Buckeye—Native
White-heart Hickory	Linden—Native
and others—Native	Dogwood—Native
Red Birch—Native	Sourwood—Native
White Birch—Native	Silver Bell—Native
Cherry Birch—Native	White Ash—Native
Beech—Native	White Willow
White Oak—Native	Yellow Willow
Red Oak—Native	Weeping Willow
Tulip Tree—Native	Bay Willow
Sweet Gum—Native	Kentucky Coffee Tree
Redbud—Native	Crepe Myrtle
Yellowwood—Native	Japanese Cherry
Black Locust—Native	

*Evergreen Shrubs and Canes*

Rhododendrons—Native	Japanese Holly
Kalmias—Native	Mahonia japonica
Yuccas	Rosemary
Quihoui Privet	Lavender
Abelia grandiflora	Nandina
(partially evergreen)	Bamboos

**Evergreen Shrubs and Canes**

(See also Hedge Plants)

**RHODODENDRONS.** We have in our state five species of Rhododendron, *R. maximum*, *R. catawbiense*, *R. carolinianum*, *R. minus*, and *R. punctatum*. Of these the first two are the largest and most commonly cultivated. The second is one of the parents of many fine hybrids

that are unsurpassed among evergreen shrubs. A few of the best of these hybrid varieties are *album elegans* (light blush changing to white, very large), *Boule de Neige* (white, early, small), *E. S. Rand* (rich scarlet, medium), *Everestianum* (delicate rosy lilac, spotted with yellow, small), *Kettledrum* (rich crimson suffused with purple, large).

**KALMIA, MOUNTAIN LAUREL** (*Kalmia latifolia*). This fine shrub succeeds very easily in the mountains in almost any soil except lime where the ground is not too wet, and it is also adapted to cultivation in other parts of the state if its needs are intelligently met (see p. 26).

**JAPANESE LAUREL** (*Aucuba japonica*). A slow growing shrub with glossy leaves and handsome red berries on the pistillate plants. It endures smoke and dust and is valuable in large cities where few things do well. It is good in evergreen beds either alone or in front of taller sorts. Like the holly the plant is of two sexes and only the female bears berries. A variety of this is the *Gold Dust Tree* (var. *aurea maculata*) of more rapid growth and the leaves spotted with yellow. Middle and eastern sections.

**JAPANESE PITTOSPORUM** (*Pittosporum Tobira*). A winter flowering shrub with very dense, dark green leaves; flowers pure white and fragrant. A very handsome evergreen of great permanence and value in coastal sections. It is killed or badly injured by a temperature of 10° F.

**OLEANDER** (*Nerium oleander*). An old-fashioned shrub with single or double flowers in various colors. Easy to grow and withstands the dust and smoke of cities well, but only half hardy away from the coast.

**WAX MYRTLE** (*Myrica cerifera*). A shrub with narrow fragrant leaves and with wax-coated, bluish white berries; native to the coastal plain. This should be much used for hedges and boundaries in low sandy places in the eastern section.

**Mahonia japonica**. From 2 to 4 feet high, the large, compound leaves with spiny teeth and the yellow flowers appearing in late winter or early spring. Thrives best in a partly shaded position.

**Camellia japonica**. One of the most beautiful evergreen shrubs with dense, deep green shining leaves, large waxy flowers in a great variety of colors. It blooms in early spring or late winter and is for that reason of great value and interest. It is almost or quite hardy along the coastal strip if put in a somewhat protected position.

**TEA PLANT** (*Camellia Thea*). A deep green, globose shrub with elongated leaves and white flowers that bloom in winter. It is hardy along the coast and as far inland as Fayetteville and should be planted for its great interest as the producer of a popular drink.

**GARDENIA OR CAPE JESSAMINE** (*Gardenia florida*). One of the best known evergreen exotics of the South and associated like the Camellia and Sweet Olive with old southern gardens. The leaves are shiny and the flowers waxy white. It is hardy through most of the coastal plain,



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Path with Van Houtte's spirea on right and McCartney roses, etc., on left





and if put in a protected position may be kept living indefinitely at Chapel Hill, though often cut back by severe frosts.

**LAURESTINUS** (*Viburnum tinus*). An upright shrub of dense compact form and with abundant umbels of whitish flowers in winter. The flower buds are red and have color a long time before they blossom. Hardy at least as far inland as Raleigh. The nurseries recommend three other evergreen varieties which we have not seen in cultivation. They are *Viburnum odoratissimum*, *V. suspensum* (*V. sandakma*) and *V. rhytidophyllum*.

*Viburnum rhytidophyllum*. A stout, spreading bush with long leaves which are deeply lined on the surface with sunken veins. The brown flower heads for spring bloom are formed the preceding fall, as in the case of Paulownia. This shrub has a healthy and permanent growth and is very valuable for massing in shady places.

**LONICERA nitida**. This evergreen is a recent introduction from China and from its foliage and growth one would hardly guess it to be a honeysuckle. It has small deep green leaves somewhat like box and makes a dense, rounded growth that gives promise of being finely adapted for hedges and for massing. In Chapel Hill it is quite hardy and is a strong and healthy grower. It can be easily propagated by cuttings.

**ROSEMARY** (*Rosmarinus officinalis*). An herbaceous evergreen shrub with aromatic, dark green, linear leaves and light blue flowers. Very good for foundation planting.

**LAVENDER** (*Lavendula vera*). An evergreen herbaceous shrub with fragrant whitish leaves and blue flowers. Very pretty for foundation planting, especially if alternated with the contrasting dark green of rosemary.

**DWARF PALMETTO** (*Sabal glabra*). This little palmetto with creeping stems extends along our coast and can be used to fine effect in the coastal strip. For the tree palmetto see under trees, p. 67.

**YUCCAS**. We have at least four native species, all of which are good. *Yucca aloifolia* is the tallest and is well placed at the corners of buildings behind smaller species; *Yucca gloriosa* is good for clumps in angles of paths. In *Yucca filamentosa* and its variety *concava* the leaves rise only a foot or so above the ground but the tall scape of white flowers is very conspicuous and attractive in masses.

**Canes or Bamboos**. A number of oriental bamboos make very hardy and excellent screens and windbreaks, although there is some objection to them as they spread by underground runners. Among the most valuable are Palmate-leaved Bamboo (*Bambusa palmata*), Tall Chinese Bamboo (*Arundinaria Simoni*), Japanese Cane (*Arundinaria japonica*). Of these the Japanese Cane is the highest and the Palmate-leaved Bamboo the lowest.

## Deciduous Shrubs

(See also Hedge Plants)

**FIVE-LEAVED ANGELICA** (*Acanthopanax pentaphyllum*). Large, 5 to 10 ft., useful for its foliage which is bright green and shining. Graceful and compact in outline and very permanent. If the tips of the arching branches touch the ground they easily take root and form new plants.

**ROSE of SHARON** (*Althea frutex*, *Hibiscus syriacus*). A tall open shrub that is very valuable, as the flowers appear late in summer and early fall when few other shrubs are in blossom. It should be used behind lower and more compact shrubs. Among the best varieties are: *ardens*, *bicolor*, *carneo-plenus*, *Jean d'Arc*.

**GROUNDSEL TREE** (*Baccharis halimifolia*). An abundant shrub in damp places near the coast. The dark green and lustrous leaves and the fluffy white fruiting heads make it very good for damp places. Hardy throughout the state in cultivation and nearly evergreen on the coast.

**SPICEWOOD** (*Benzoin aestivale*). Native to the state. A good shrub for damp places. The small greenish flowers, while not conspicuous, appear early in spring before the leaves and are pretty and fragrant. The leaves and branches also have a spicy fragrance.

**EUROPEAN BARBERRY** (*Berberis vulgaris*). A sturdy shrub with yellow flowers in hanging clusters, scarlet berries and light green leaves. Does well in the middle and western sections. The variety *purpurea* is a good purple-leaved variety of this.

**SUMMER LILAC** (*Buddleia Davidii Veitchiana*). An open shrub with long, simple, arching shoots which bear large heads of fragrant pale violet flowers from June to frost. As few shrubs flower during the summer and fall this handsome one is of distinct value.

**SLENDER DEUTZIA** (*Deutzia gracilis*). A small shrub about 2 ft. high with graceful, arching branches and nodding racemes of pure white flowers in early spring. Very pretty and valuable for foundation planting.

**DEUTZIA** (*Deutzia scabra*). A strong and permanent shrub with whitish flowers in abundance. Blooms just after spireas and can be planted with them to good effect. A double variety of this with pink flowers is *plena rosea* and a double white is *plena alba*.

**GOLDEN BELL** (*Forsythia Fortunei*). A tall shrub, with slender, upright branches and golden yellow flowers, produced in great profusion, blooming in March. This and the other forsythias are among the most dependable and satisfactory early spring bloomers and should be extensively used. Other species are *intermedia* with more arched growth and *suspensa* with slender, drooping branches.

SILVERTHORN (*Elaeagnus longipes*). A very permanent and hardy shrub of good rounded form with dense leaves silvery beneath, and with red berries that make a good jelly.

WINGED BURNING BUSH (*Euonymus alatus*). A dense spreading shrub with corky-winged branches. Flowers yellowish, fruit purplish; leaves turning to gorgeous shades of red and crimson in the fall.

PEARL BUSH (*Exochorda grandiflora*). A tall hardy shrub with dazzling white blossoms. As it is apt to become bare below, it is best to mass it with or place it behind other shrubs.

PANICLED HYDRANGEA (*Hydrangea paniculata*). A very hardy tall shrub with white flowers borne in panicles; very good for massing. It will not succeed in dry or poor places and in the coastal plain should be planted only where rich, damp ground is available. A garden form of this, var. *grandiflora*, has extremely large and showy flowers and is very popular. In the mountains both will succeed in any rich soil.

SWEET SHRUB, SWEET BETSIE (*Calycanthus floridus*). An upright shrub with dark foliage and very fragrant, dark brown flowers, which are loved by children. Native in the mountain and middle sections. It is easily increased by shoots from the base.

DESERT WILLOW (*Chilopsis linearis*). A tall open growing shrub with linear leaves and yellow-striped lilac flowers. Blooms continually from April until frost. The plant has an exotic look and is good for contrast and interest.

FRINGE TREE (*Chionanthus virginiana*). A shrub or low tree with dark green leaves and feathery, graceful, very fragrant flowers in long clusters. Native to the state and a member of the olive family as one might easily guess from the small olive-like blue fruits. One of the best tall ornamentals for the back of borders.

AZALEAS. Our state is rich in species of azaleas and some are found in all sections. If given proper conditions they will be a brilliant addition to any place (see p. 26 for directions). In the mountains the great flame azalea (*Azalea calendulacea*) and the tall white azalea (*A. arborea*) are the best to use. In other parts of the state the last mentioned, together with *A. viscosa* and *A. nudiflora*, are successful. In the damp, sandy flats of the coastal region *A. atlantica* will do well. Among exotic species *A. amoena* and *A. Hinodegiri*, which are evergreen, are most adaptable and thrifty.

SWEET PEPPERBUSH (*Clethra alnifolia*). A small shrub of marshy soil with alder-like leaves and showy white flowers of an intense, spicy fragrance; especially useful in wet places.

RED-OSIER DOGWOOD (*Cornus stolonifera*). A shrub with dark red branches and creamy white flowers. The red shoots are extremely showy in winter, but from our experience it is not very permanent in this state.

WINTER FLOWERING JESSAMINE (*Jasminum nudiflorum*). A small shrub with slender, arched, green branches and yellow flowers which bloom in winter and early spring. This is about the best plant for the front of a shrub border as it forms a dense pillow from the very ground and fits in perfectly to meet higher shrubs.

GLOBE FLOWER, GUELDER ROSE (*Kerria japonica*). A shrub 4 to 6 ft. tall, with numerous, bright yellow, large and showy flowers and green stems. One of the most beautiful shrubs and extremely valuable when not attacked by a fungus, which in Chapel Hill has killed out almost every single specimen in recent years. The *guelder rose* is a variety of this with double flowers.

SHRUBBY BUSH CLOVER (*Lespedeza bicolor*). A shrubby herb 3 to 5 ft. tall, with dark green leaves and showy purple flowers. The branches die to the ground every year, but quickly come again in spring and curve over in a graceful way to meet the ground.

SWEET BREATH OF SPRING (*Lonicera fragrantissima*). One of the most charming of the early flowering shrubs, with a delightful fragrance noticeable at a long distance. Graceful throughout the year and semi-evergreen with us. Its permanence, hardiness, and large size are great advantages and it should be used abundantly.

LILACS (*Syringa vulgaris* and *Syringa persica*). These old favorites are extremely useful in the middle and western sections, but in the coastal plain they do not bloom freely and lose their value. In addition to the old types there are very many greatly improved varieties and it is very desirable that someone should make a hobby of them and test out their flowering qualities here. Among the best are *Marie Legraye*, white; *Persica alba*, white; *Louise Henri*, lilac; *Ludwig Spaeth*, red; *Prof. Stockhardt*, lavender.

SNOWBERRY, WAXBERRY (*Symphoricarpos racemosus*). A graceful, low shrub with slender curved branches, rose-colored flowers and persistent white berries. Excellent for covering ground under trees or for massing where something low is desired. Its habit of suckering enables it to cover the ground rapidly.

CORALBERRY (*Symphoricarpos vulgaris*). Very similar to the above, with coral colored berries.

FRAGRANT SUMACH (*Rhus canadensis*). A spreading shrub 3 to 8 feet high with aromatic leaves; flowers yellow, the small fruit coral red. Will flourish in any soil, especially dry rocky banks.

SMOKE BUSH (*Rhus cotinus*). A very permanent bush 10 to 12 feet high with feathery, purple heads, giving the plant a smoky appearance. Blooms in early summer.

WHITE KERRIA (*Rhodotypos kerrioides*). An ornamental shrub with large white flowers followed by black and shining nutlets which persist during the winter. Thrives in any good soil.





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Clump of McCartney roses (right); linden (left)



BUCKTHORN (*Rhamnus carolinianus*). A small tree; leaves dark green and shiny; berries first red then black. Very hardy and excellent for foliage effect and as a background for shrubs.

POMEGRANATE (*Punica granatum*). A tall, summer flowering shrub with orange, pink, white, red, or striped flowers and edible fruit. Fills a much needed place with its late flowers.

SYRINGA, MOCK ORANGE (*Philadelphus coronarius*). A hardy shrub with upright, often arching branches; flowers creamy white and extremely fragrant and very numerous. Handsome and desirable behind smaller shrubs.

SYRINGA, MOCK ORANGE (*Philadelphus grandiflorus*). A native unscented species of the same usefulness as the preceding.

NARROW-LEAVED CRAB APPLE (*Malus angustifolia*). A low bushy tree with stiff, thorny branches, leaves narrow and half evergreen. Flowers rosy red and very fragrant; fruit yellowish green. Native to the state and exceedingly decorative unless impaired by the cedar apple rust or San José scale.

STARRY MAGNOLIA (*Magnolia stellata*). A large shrub or tree with spreading branches. Flowers numerous, white, scented, appearing before the dark green abundant leaves.

### Vines

FIVE-LEAVED AKEBIA (*Akebia quinata*). A very ornamental climber with twining stems; leaves almost evergreen; flowers rosy purple, produced in late spring. It prefers moist loamy soil and sunny exposure and is especially useful to train over doors and windows as the growth is limited and does not require much trimming and control.

CHINESE WISTERIA (*Wisteria chinensis*). A very strong climber with flowers borne in long dense purple clusters which appear in spring before the leaves. One of the most beautiful vines for pergolas, buildings and old trees. A white variety is equally good.

*Jasminum primulum*. A delicate vine of moderate size. Its exquisite fragrance when in flower should win it a place somewhere in every garden.

STAR JESSAMINE (*Trachelospermum jasminoides*). A beautiful evergreen climber with dark green foliage and deliciously fragrant white flowers in May and April and again in November and December. It should be put into rich, moist soil and does best in the eastern section.

ENGLISH IVY (*Hedera helix*). A well known and excellent evergreen for decorating buildings, trees and walls. Easily obtained from cuttings. It dislikes hot sun and in the eastern section should be given a shaded location.

**YELLOW JESSAMINE** (*Gelsemium sempervirens*). A twining vine with persistent deep green leaves and bright yellow fragrant flowers in early spring. Does well in cultivation where the soil is not too dry and should be used much more.

**CLIMBING EUONYMUS** (*Euonymus radicans*). An evergreen vine climbing with rootlets to the height of 15 or 20 feet. Good for covering walls, rocks or trunks of trees. Leaves small, fruit pink or scarlet. If clipped it also makes a fine border or low hedge. There are several varieties, of which *vegetus* is probably the best.

**BOSTON OR JAPANESE IVY** (*Ampelopsis tricuspidata*). A hardy and very useful vine, climbing high by means of disc-bearing tendrils. Resists the dust and smoke of cities and turns to a vivid orange and scarlet in the fall. Excellent for covering brick or stone buildings.

**VIRGINIA CREEPER** (*Ampelopsis quinquefolia*). One of the most refined and useful of our native vines. The adhesive tendrils enable it to climb either solid masonry, trees or trellises and it is especially fine for covering fences. The gorgeous fall coloring is unsurpassed.

**PEPPER-VINE** (*Ampelopsis arborea*). This is native to our seashore and its much compounded leaves are even more delicate than those of the Virginia Creeper. It is very vigorous and does well as far west as Chapel Hill.

**GRAPES**. Any vigorous species of grape makes a good arbor vine. The wild sorts as *summer grape*, *fox grape*, and *possum grape* are delightfully fragrant in flower and have very healthy foliage. The *scuppernon* and *wild bullace grape* are almost too rampant for use except on large arbors.

**CROSS VINE** (*Bignonia capreolata*). A hardy native vine. Flowers reddish orange, yellow within, very showy. The tendrils climb by sucking discs and enable the plant to climb tree trunks, walls, or buildings.

**TRUMPET VINE** (*Tecoma radicans*). This is one of the best vines to run up posts of fences and to cover outhouses. The very conspicuous red and orange flowers bloom for a long time in late spring and summer.

**JAPANESE CLEMATIS** (*Clematis paniculata*). A very fine vine for porches, arbors and fences. The white flowers in foamy masses practically cover the plant in late summer.

**VIRGIN'S BOWER** (*Clematis virginiana*). This native species has much the same habit as the above and is equally useful.

**HONEYSUCKLES**. Several of these are good. Our wild *trumpet honeysuckle* with beautiful, red-orange flowers is one of the best. The *Japanese honeysuckle* is an evergreen and very useful if care is taken to plant it only where it will not have a chance to invade hedges and shrubberies.

**CLIMBING ROSES**. There is a long list of good roses suitable for training on arbors, porches and fences. The fine old evergreen *Cherokee*,





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Weeping Japanese cherry in flower





and the delightful *Lady Banksia* are two of the very best for the sandier and warmer parts of the state. Of the newer single sorts the *American Pillar* and the *Silver Moon* have no superior in beauty and are almost quite free from the destructive mildew that ruins the usefulness of so many kinds. In Chapel Hill the *Dorothy Perkins*, *Lady Gay*, *Crimson Rambler* and *Memorial roses* are all badly hurt by this pest. Of the hybrid double-flowered sorts some of the best are *Climbing Clothilde Supert*, *Climbing Meteor*, *Reine Marie Henriette*, *Souvenir de la Malmaison* and *Devoniensis*.

ANNUAL AND ROOT-PERENNIAL VINES. Many of these are useful for quick results and are well known. *Morning Glory*, *Moon Flower*, *Cypress Vine*, *Balsam Vine*, *Madeira Vine*, *Cinnamon Vine* and *Hop Vine* are among the best.

### Hedges and Hedge Plants

Hedges or closely planted borders may either be clipped to an ordered form or allowed to grow freely. As clipping is labor we should plan a free hedge when it would serve equally well for use or effect. For screening ugly houses or unpleasant views clusters or rows of untrimmed plants do quite as well as, or better than, trimmed hedges. If it is important to have a boundary that will keep out animals or people, the growth can be made denser by severe clipping during the first few years, and thorny plants should be used as already mentioned. Most if not all the clipped privet hedges we see are not worth the labor they cost and are indeed far less beautiful as a rule than a hedge or boundary of some other sort that requires only a fraction of the care.

For the front boundary along the sidewalk or road there is nothing so good as a low wall of rock or brick. Behind this, if one wishes, may be planted a free hedge of *Thunberg's spirea* or *Thunberg's barberry* or winter jessamine or a row of *iris* or *yucca*. If a wall cannot be afforded, it is along this front boundary that a low hedge is most in place. For boundaries between lots or to border paths it is much better to use *spireas*, *Japan quinces*, *lilacs*, *barberries*, *rugosa* or *spinosissima roses*. They need very little trimming to be kept in nice shape. A shortening of unruly branches once a year is enough (for best

time for this pruning see page 25). *Box* or *arbor-vitae* are easily kept in formal shape with very little clipping. *Yuccas* or *iris*, which of course require no clipping, will also make a pretty division line or walk border. In the coastal region a beautiful hedge can be made of *wax myrtle* or of *yopon*, the latter requiring clipping if a dense hedge is desired.

Below are listed the best available hedge plants for our state:

**JAPANESE BARBERRY** (*Berberis Thunbergii*). The best shrub for a low, unclipped hedge in the middle and western sections. Very healthy and hardy, it has the further advantage of small, dense foliage which turns to beautiful colors in the fall, and of bright red berries for winter color. The abundant prickles are very discouraging to unwelcome animal visitors.

**BOX** (*Buxus sempervirens* and the dwarf variety.) The box is too well known to need description. For permanence and dignity there is no evergreen shrub that can quite take its place and it is only to be feared that in this restless age it will too often be neglected for other quicker growing but inferior plants.

**TRIFOLIATE ORANGE** (*Citrus trifoliata*). An excellent hedge plant for boundaries, as its formidable thorns will turn both man and beast. It is decorative at all times of the year, bearing fragrant white flowers in spring, showy, yellow, inedible oranges in the fall, with its green stems conspicuous in the winter. It is about ten to fifteen feet high, if allowed to grow freely, but may be kept down and made denser by clipping.

**JAPANESE QUINCE** (*Pyrus japonica*). Among the few good spiny hedge plants this stands among the very best. It is very strong and permanent, hard to penetrate, and if the best varieties are chosen it is one of the most brilliant of all shrubs when in flower. The kinds that flower before the leaves appear are much superior to the commoner kinds with flowers among the leaves. There are a good many varieties of the better sort varying from brilliant scarlet to white, but unfortunately they are rarely offered by southern nurseries in a discriminating way.

**JAPANESE EUONYMUS** (*Euonymus japonicus*). This excellent old favorite is much used in the South for evergreen hedges and few things are handsomer than a well-kept *Euonymus* hedge. The reputation of the plant for freedom from disease has recently been rudely upset by the introduction of a most destructive scale insect which kills it in a few years when present. One of the saddest tragedies we have ever seen in gardening was the complete destruction of all the *Euonymus* hedges in Chapel Hill within the last few years.

YOPON (*Ilex vomitoria*). A small slender evergreen tree, native to our coast. Leaves small, berries red. Does well in cultivation, at least as far west as Chapel Hill, but is apt to be straggling in shape. As a hedge plant it is one of the best for the coastal plain, as clipping corrects its straggling habit and transforms it into a dense hedge.

CAROLINA LAUREL CHERRY (*Laurocerasus caroliniana*). For description see p. 65.

JAPANESE PRIVET (*Ligustrum Japonicum Nepalense*). A dwarfish variety of the Japanese privet that is very good for a clipped hedge or an uncontrolled specimen. When unclipped it has a pleasing irregularity and is fine for planting against the house foundations.

AMOO RIVER PRIVET (*Ligustrum chinense*). This is the most popular hedge plant in our state and where a formal hedge is needed it is good. When clipped it is entirely evergreen in Chapel Hill. The common name of the plant should be Chinese Privet, the real Amoor River Privet being *Ligustrum amurense*, but the latter name has become so widespread that to change it here would cause confusion.

REGEL'S PRIVET (*Ligustrum Ibota Regelianum*). Of all the deciduous privets this is the best as a decorative shrub. The spreading habit is much more pleasing than the stiff upright form of other sorts and its strong growth and compactness make it most desirable in mass planting.

QUIHOU PRIVET (*Ligustrum Quihoui*). An evergreen privet with small, narrow, dense leaves and tall habit that is one of the very best evergreens we can use for a screen or for mass planting. There is nothing better as a screen for small outhouses.

JAPANESE ROSE (*Rosa rugosa*). The peculiar foliage of the Japanese rose is particularly charming and its dense habit fits it for hedges. Among the best varieties are Blanc Double de Courbet, Conrad Ferdinand Meyer, Mme. Georges Bruant, Nova Zembla.

SCOTCH ROSE (*Rosa spinosissima*). The remarkably dense habit and delicate leaves of this vigorous shrub make it one of the best spiny hedges. The small but very numerous white or pink flowers nearly cover the plant in April. It spreads by underground runners and has to be kept in check. It is excellent for bordering fences or planting along the corners of walks.

MCCARTNEY ROSE (*Rosa bracteata*). This is a very strong and vigorous rose with long arched, very prickly branches and large single white flowers. It is distinguished from the Cherokee, with which it is often confused, by the larger number of leaflets (5-7 instead of 3) and the large green bracts beneath the flower. As an untrimmed or sparingly clipped hedge it is very useful, and it is fine in a group on the lawn.

BRIDAL WREATH (*Spiraea prunifolia* and the var. *flore pleno*). This old favorite well deserves its great popularity. For fighting power

under adverse conditions it is remarkable and as a hedge in shade and among tree roots has no equal. The flower buds are never killed by cold and never fail. The color of the leaves in fall is fine and the habit of suckering around the base makes it easy to increase and therefore obtainable from neighbors as a rule without cost.

THUNBERG'S SPIREA (*Spirea Thunbergii*). This species is coming into great favor as a hedge and border shrub and for planting against the house. Of small to medium size and very delicate, graceful, arching habit, it is always beautiful. The pure white, delicate flowers cover the branches in early spring and are wonderfully effective. In fall the leaves change to the most beautiful and varied tones of orange, bronze and red. For best effect this shrub should be clipped back every year or second year to give denser habit.

VAN HOUTTE'S SPIREA (*Spirea Van Houttei*). A beautiful strong plant that deserves to stand among the four or five best shrubs for general uses. It is arched and graceful in shape and is covered with masses of white flowers in early spring.





ARBORETUM OF UNIVERSITY OF NORTH CAROLINA

Elms with climbing roses; cedars between



## DESCRIPTIONS OF DECORATIVE TREES, LARGELY NATIVE

### Deciduous Trees

**WILLOW OAK** (*Quercus phellos*). Plate 29, fig. 1. The Willow Oak is a common tree of the low grounds and flats of the coastal plain and extends more sparingly into the Piedmont. Its leaves are small, narrow, pointed at both ends, resembling those of the Willow; the acorns are small and not abundant. It is related to the Water Oak, but is of larger size and longer life. In cultivation it is one of the most satisfactory of all our oaks, and as an ornamental shade tree it has no superior. One specimen in Chapel Hill has a circumference of twelve feet at five feet from the ground, and a spread of seventy-two feet. It is especially suited to low, moist places, but does well in any good soil. It may be used to excellent advantage as a street tree on wide streets, or as a lawn tree in home grounds, school grounds, or parks.

**LAUREL OAK** (*Quercus laurifolia*). Plate 25 and plate 29, fig. 2. The Laurel Oak is a beautiful, nearly evergreen tree occurring in moist woods and beside streams in a rather narrow strip along the coast. It is intermediate in appearance between the Willow Oak and Water Oak. Its leaves are thick, usually without lobes, sometimes slightly notched, and are largely evergreen, though they gradually fall from the outer branches during the winter. The acorns are small, with shallow cups, and are very abundant. This tree is one of the finest oaks in America, and is becoming very popular as an ornamental shade tree. Our photograph (Plate 25) shows the fine form and symmetry of the young tree which is retained through life if not crowded. In eastern North Carolina and in the PeeDee section of South Carolina, it is much used for street and lawn planting. It is sometimes called Darlington Oak, for Darlington, S. C., where it is extensively used as a street and lawn tree.

**WATER OAK** (*Quercus nigra*). Plate 29, fig. 3. The Water Oak grows plentifully along streams and in low grounds in the coastal plain, and extends along streams into the central Piedmont region. It is of medium size and develops a wide, rounded head when not crowded. Its branches are numerous, and slightly drooping; its leaves are small, smooth, without teeth, and broadest at the outer end; its acorns are small, with a shallow cup, and abundant. This oak is a handsome tree, of fairly rapid growth, is easily transplanted, and retains its leaves until late in the fall. It is used extensively on streets in eastern Carolina, but it is shorter lived than its relatives, the Willow Oak and

the Laurel Oak, and according to our experience, is much more subject to mistletoe.

**PIN OAK** (*Quercus palustris*). Plate 30, fig. 9. The Pin Oak is found naturally in rich low grounds. Its leaves are small, cut nearly to the mid rib, with conspicuous tufts of hairs in the angles of the larger veins. The acorns are small, about one half inch long, flattish, and in nearly flat cups. It is a common tree further north and has not been known until recently to be native to North Carolina, but it has now been found in fair numbers in swamps near Chapel Hill. This oak is a tall, symmetrical, pyramidal tree, sometimes seventy feet high, with many slender branches. The lower, drooping branches extend down to the ground, a habit which makes the tree unique and especially desirable as a lawn specimen. It has also proved to be a very good street tree.

**WHITE OAK** (*Quercus alba*). Plate 29, fig. 5. The White Oak is one of our most common and finest oaks. In Chapel Hill we have nothing to equal it, and any one who has seen a full grown, massive White Oak in all its strength and dignity will know how much a tree can mean in the life of a people. It is a large spreading tree, with light bark and foliage, and long ovate acorns of varying size in shallow cups. This tree belongs to the Piedmont and lower mountain region, being found in the coastal plain only in the neighborhood of creeks and rivers. In Chapel Hill, the White Oak reaches a circumference of eighteen feet at five feet from the ground; its buttressed base at one foot from the ground may reach twenty-nine feet. We have measured the famous old "Wilson Oak" at Smith's Grove, Davie County, and find it to be twenty-one feet in circumference at five feet from the ground, with a spread of one hundred and twenty feet.

**RED OAK** (*Quercus rubra*). Plate 29, fig. 6. The Red Oak is a fine tree found abundantly in good soil in the mountains, not rarely near the edges of low grounds and along branches in the Piedmont, and very sparingly in similar situations in the coastal plain. The leaves are large, broad, smooth, dull, deep green on both sides, and the foliage effect is richer than that of any other oak. The acorns are very large, in nearly flat cups. This tree is very beautiful for the home grounds. It is often confused with the Scarlet Oak, but they grow in different places, the acorns are unlike, and the leaves are dull beneath in the Red and shining in the Scarlet Oak.

**SCARLET OAK** (*Quercus coccinea*). Plate 30, fig. 7. This fine native oak is of good form and very fine foliage which turns brilliant scarlet in fall. It is the commonest oak in the mountains and is plentiful on poor, rocky hills in the Piedmont. In the coastal plain it is found mostly in the valleys. Its leaves are deeply cut and shining; its acorns vary in size and shape, but never reach the size of Red Oak acorns, the



cup fairly low, but not flat like the cups of the Red, Swamp Red and Pin Oaks. It is not among the very long-lived species (as a rule) but is good for variety and fall color and is especially useful in rather poor rocky uplands. We know one very old and venerable specimen in Hartsville, S. C., probably the largest tree in the community.

SPANISH OAK OR SOUTHERN RED OAK (*Quercus falcata*). Plate 24 and plate 30, fig. 8. This large and very common upland tree is said to have been called Spanish Oak by the first settlers, from the resemblance of its leaves to those of an oak which they knew in Spain. The leaves droop in a peculiar way which makes the tree noticeably different from other oaks. It has gray bark and deep green foliage; the under side of the 3- or 5-lobed, rather narrow leaf is covered permanently with yellowish gray hairs, and the central lobe is longer and narrower than in other species. On young trees and sprouts the leaves are wedge-shaped and 3-lobed at the end. The acorns are small and have a red scar. The Spanish Oak, often called Red Oak or Southern Red Oak, extends from the coast to an elevation of over 2000 feet in the mountains. It is long-lived, not easily subject to decay, and in Chapel Hill reaches a circumference of sixteen feet nine inches at five feet from the ground.

WHITEHEART HICKORY (*Hicoria alba*). Plate 26 and plate 32, fig. 20. This is our most common hickory. It occurs plentifully throughout the state, and is highly valued for its strong, tough wood. It is a tall, short-limbed tree with light, ridged bark and large, hairy, strong-scented leaves which remain on the tree longer than is the case with other hickories, and which turn a beautiful yellow in the fall. The buds are large with thickened outer bud scales which fall during the winter, leaving it smooth and velvety. The hull of the fruit is moderately thick, splitting away from the nut which is thick-shelled and very variable in size and shape. The Whiteheart Hickory may be used in any part of the state and is one of the best trees for school grounds. Recently, however, a disastrous and obscure disease has attacked all of our hickory species in Chapel Hill and many of our finest specimens have died in the last three years. The trouble seems to be due to stoppage of the conducting tissue of the wood by some so far unknown organism. The top dies first then the limbs in order downward, the leaves sometimes putting out vigorously in the spring only to wither suddenly before full grown. When cut down the heart wood is found to be water logged and bleeds profusely. This devastation is hardly less destructive to the hickory than the chestnut blight to that tree, and it would seem wise not to plant hickories until something is known of the future course of this disease.

PECAN (*Hicoria pecan*). Plate 32, fig. 22. The Pecan is not native to North Carolina, but is found in the swamps of the lower Mississippi



Valley and Texas. It is a fine, healthy nut and shade tree which prefers the deep, loamy soil of river bottoms in the coastal plain, but will grow well in uplands throughout the Piedmont region. It is the largest of the hickories, sometimes reaching a height of 160 feet and a trunk diameter of 5-6 feet when growing in the forest. In the open, the branches are wide-spreading, forming a broad, round-topped head. The leaves are pinnately compound with 13 to 15 leaflets each; the nut, enclosed in a thin hull, is long, pointed, and thin-shelled. Though the foliage is not particularly attractive, yet the Pecan tree is excellent for use on home or school grounds or in parks, and should be much more often planted.

**BLACK WALNUT** (*Juglans nigra*). Plate 33, fig. 27. The Black Walnut is a large, well-known, and very valuable timber tree, with a spherical, rough nut enclosed in a thick, warty, unopening hull. Its bark is black and deeply furrowed. Its leaves are pinnately compound, each leaf bearing from thirteen to seventeen leaflets. It occurs sparsely scattered through old fields and rich woods except in the high mountains, and is most common in the middle section of the state. In the open ground it becomes a tree of great size and marked beauty, and spreads grandly with age, sometimes attaining a height of 80-100 feet and a trunk diameter of 3 feet or more. It is a splendid tree for school grounds or private lawns, its only fault being that the leaves appear late and drop early.

**WHITE ELM** (*Ulmus americana*). Plate 33, fig. 29. The White or American Elm has been described by Michaux as "the most magnificent vegetable of the temperate zone." It is a large and beautiful tree, plentiful in low grounds in the coastal plain and in the Piedmont to Guilford and Mecklenburg Counties. Its leaves are not fuzzy as those of the Slippery Elm, but are slightly rough above and velvety below; the twigs are smooth, and the edge of the fruit wings is hairy. The elm-leaf beetle that has injured or destroyed so many of the fine elms in the North is present in North Carolina, but does very little damage except to the few English Elms that are cultivated. Only occasionally is a White Elm found that seems susceptible to the beetle. Its plume-like form, hardiness and longevity make this one of the most popular shade and lawn trees of the South. It is a splendid street tree, but it should be avoided on streets with sewers, unless these are of the most modern construction, as its roots often completely fill them.

**SUGAR MAPLE** (*Acer saccharum*). Plate 30, fig. 10. The Sugar Maple is the finest of all our maples and is very desirable in cultivation. It is plentiful in our mountain valleys and slopes, occurring at an elevation of 2000 feet. Its tall and rather columnar form, its hardiness, its rapid growth in good soil (preferably in rich uplands or mountain slopes),



EVERGREEN PHOTINIA IN ARBORETUM OF UNIVERSITY OF NORTH CAROLINA



the beauty of its foliage, and its freedom from disease and insect pests, combine to make the Sugar Maple an excellent street tree, as well as an ornamental shade tree, in middle and western sections of the state. Its autumn coloring is magnificent.

**NORWAY MAPLE** (*Acer platanoides*). Plate 30, fig. 11. The Norway Maple is a native of northern Europe, but has been so widely planted that it is now occasionally spontaneous about cities and towns. Though smaller than the Sugar Maple, it has a vigorous growth and forms a dense rounded head. Its leaves can be distinguished from those of the Sugar Maple by the longer, sharper teeth, and its winged fruits (samaras) are larger and more widely spread. They turn bright yellow in the fall. This maple is hardy, immune from attacks of insects and fungous diseases, symmetrical, and well able to withstand the smoke and dust of both city and village streets. These qualities make it one of the best street trees, its form and height making it especially desirable for rather narrow streets. It seems to adapt itself to the soil and climate of all sections of the state.

**RED MAPLE** (*Acer rubrum*). Plate 30, fig. 12. The Red Maple is a common tree in North Carolina, inhabiting swamps and low grounds in the upper coastal plain and valleys and hillsides in the Piedmont and mountains. The leaves have three to five lobes which are strongly and irregularly toothed, pale and usually smooth beneath; the flowers are typically bright red but vary to pale greenish yellow, appearing very early; the fruits, which vary in color like the flowers, ripen in early summer. The twigs and leaf-stalks are also red in the red form, and in autumn the foliage turns a fine scarlet. This maple is desirable as a shade tree, but is often subject to a serious bark scale. It prefers moist places in any good soil in the middle or eastern sections of the state, and surpasses all other maples in beauty of flower and fruit.

**BOX ELDER, ASH-LEAVED MAPLE** (*Acer negundo*). Plate 38, fig. 55. The Box Elder is a small tree of wide-spreading, rapid growth, found along sandy river banks and in bottoms. It is rather common in the Piedmont, though it extends into the lower mountain valleys and along the larger rivers in the coastal plain. The leaves have three leaflets which somewhat resemble those of an ash; the maple-like fruits hang in elongated clusters. This tree is to be recommended as a lawn tree that will give quick shade, and is much better than the more often used Silver Maple or Carolina Poplar.

**GREEN OR RED ASH** (*Fraxinus pennsylvanica*). Plate 31, fig. 13. The Green Ash is a tree of medium size with slender, spreading branches, forming a shapely, round-topped head. It is distinguished from other ashes by the very long and very narrow seed which is pointed below, by the shape of the spatulate seed wing, and by the leaves being green,



not whitish, and more or less velvety beneath. The leaf stalks and twigs vary from quite velvety to smooth and the margins of the leaflets are even or obscurely toothed. It is a common tree along rivers and low grounds in the Piedmont and lower mountain regions. It grows fairly rapidly and is quite valuable as a street tree, though it is also suitable for use in parks and home grounds.

WHITE ASH (*Fraxinus americana*). Plate 31, fig. 14. This is the largest, most useful, and most widely distributed ash in the state, occurring abundantly in the mountains and Piedmont in rich moist soil, and extending down the valleys into the coastal plain. It is a tree of rapid growth, and is usually free from attacks of insects and diseases. Thus it is well adapted to street planting, the chief drawback being the lateness of the leaves to unfold in the spring, and their early falling away in the fall. The ash has been called the Painter's Tree, being, while young, remarkable for its gracefulness, and the softness and mellow green of its foliage which produce a fine effect in contrast with the darker woods.

SWEET GUM (*Liquidambar styraciflua*). Plate 31, fig. 15. The Sweet Gum is a common, large tree with fragrant, five-pointed leaves, winged branchlets, and round, prickly polished fruits. This is one of our finest trees and is common in the low grounds of the whole state except in the mountain section, where it is found only along the larger streams at low elevations. In the Piedmont it is also found in upland woods. It reaches a very large size, sometimes 140 feet in height and 4 feet in diameter. Trees in the swamp of New Hope Creek below the bridge on the Durham-Chapel Hill road reach a circumference of 12½ feet at five feet from the ground. The Sweet Gum is a very healthy tree, is noted for the beauty of its fall color, and is adapted to formal planting, as on streets, especially in poorly drained soil where most trees fail.

HACKBERRY OR SUGARBERRY (*Celtis occidentalis*). Plate 31, fig. 17. The Hackberry is a large tree found over the entire state except in a few of the most mountainous counties, but it prefers streams and low grounds and is most abundant in the swamps of the coastal plain. The bark is very rough with corky warts; the leaves are 2 to 4 inches long, very one-sided, usually smoothish though rough and smooth leaves may occur on the same tree; the fruit is very small, purplish black, dry, sweet, but mostly stone. This tree is of rapid growth, is very hardy, can adapt itself to a variety of climates and soils, and has been found highly successful as a street and highway tree. Its foliage turns yellow in autumn.

AMERICAN BEECH (*Fagus grandiflora*). Plate 33, fig. 25. The American Beech is a handsome native tree found in the low ground along brooks and creeks, extending from the coast to the tops of the high mountains and reaching its greatest size in the rich mountain valleys. It is



practically absent in the Sand Hill region. Its bark is smooth, light gray, and usually marked with initials. Its fruit is nearly globular, with short slender prickles, and containing one or two small, angular, shining nuts. This tree, when growing in the forest, is tall and slender; but when growing in the open, is broad and low-branched, with wide-spreading or drooping branches. Where a dense shade is not objectionable, as along boundaries, or as a single specimen on the lawn, there are few trees more beautiful or permanent.

**KENTUCKY COFFEE TREE** (*Gymnocladus dioica*). Plate 35, fig. 37. The Kentucky Coffee Tree is a native of the Middle West and does not quite reach North Carolina, but it is occasionally spontaneous in neighborhoods where it is cultivated. It is so named because the early pioneers of Kentucky used its seeds as a substitute for coffee. Suckers from the roots can generally be obtained in sparse numbers near the parent tree, but this habit is not exaggerated into a nuisance as it is in some poplars. The trees are especially attractive at the time when the leaves are expanding. The leaflets near the ends of the leaf are a bright pink while those which opened first are green or bronze-colored. Each main leaf stalk bears 4 to 7 pairs of compound leaves, each of which is composed of 6 to 8 pairs of leaflets, so that each main leaf stem may bear from 48 to 174 leaflets. In winter, the branches are cane-like, with no indications of buds, and the tree has the appearance of being dead. This tree is very desirable for shade, is free from disease, and is graceful in appearance. It may be planted in any fair soil and is good for lawns or city streets.

**TULIP TREE, "POPLAR"** (*Liriodendron tulipifera*). Plate 32, fig. 19. The Tulip Tree is our largest tree, and is one of the most important for lumber. It is common in rich soil in the mountains, where it occasionally reaches a height of 150 feet and a diameter of 10 feet. It is also abundant in valleys and cool woods in the Piedmont, and occurs less commonly in valleys on the coastal plain. The Tulip Tree is straight and quick-growing, with light, close-ridged bark and large, smooth leaves, which are truncate and shallowly notched at the ends, and turn a beautiful yellow in the fall; the flowers are red and yellow, and tulip-shaped. The tree is very fine in cultivation, but is easily wounded and, were exposed, is very susceptible to sun scald in youth, usually healing so slowly that decay sets in before the wound is covered. When subjected to the hazards of human contact, this tree is nearly always found to be hollow even before it is old. Nevertheless, it is long-lived, and is splendidly adapted for a central row in broad avenues and for parks. It is a member of the Magnolia Family.

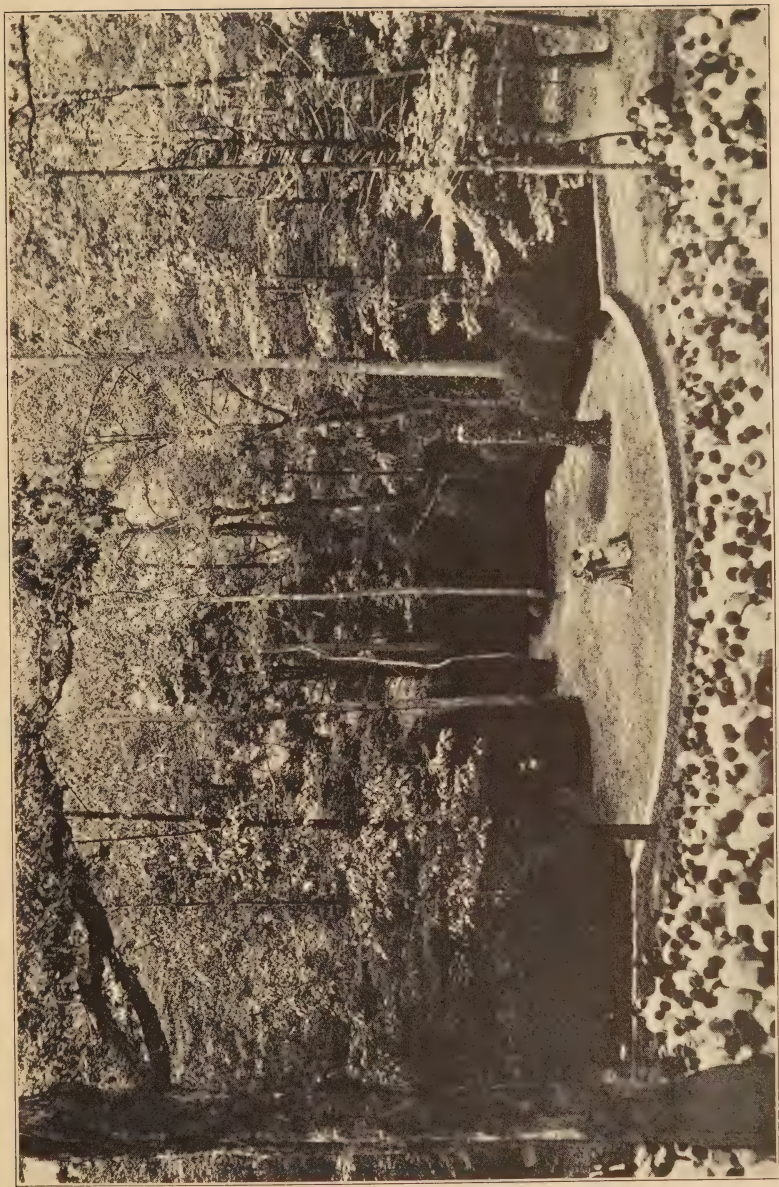
In his "Silva of North America" (vol. I, p. 19) Sargent says, "The great Tulip-tree on the steep slopes of Mount Mitchell in North Caro-

lina, the highest point of land in North America east of the Rocky Mountains, has a trunk thirty-three feet round at three feet from the ground. It stands at the head of the cove between the pool in which Professor Elisha Mitchell lost his life June 27, 1857, and the hut of the well-known mountaineer, "Tom" Wilson, who discovered his body a few days later. This tree was visited by Mr. W. M. Canby in 1866, and was then in perfect health."

SYCAMORE (*Platanus occidentalis*). Plate 31, fig. 18. A large tree with white branches and round, pendent fruits that hold their seeds until spring. Bark scaling off in thin plates; leaves large and broad, 4-8 inches across, with many irregular lobes and teeth, very woolly-pubescent when young, the enlarged base of the leaf stalk enclosing the bud. Common along the streams of the whole state, often spontaneous in uplands and much cultivated. It is one of our largest trees, and in this state often reaches a height of 110 feet and a diameter of 5 or 6 feet. It reaches a much larger size in the middle west, sometimes with a diameter of 15 feet. A very destructive disease is now killing or badly spoiling a great portion of our sycamores (nearly all in Chapel Hill), and we no longer plant this tree and advise strongly against its use. The trouble is mostly due to sycamore anthracnose, a fungus disease (*Gnomonia veneta*), which causes the young leaves to wither and fall off. This sycamore destruction is about on a par with that of the hickory and amounts to nothing less than a major catastrophe, second only to the chestnut blight.

CUCUMBER TREE (*Magnolia acuminata*). Plate 32, fig. 21. This is a tall, slender tree of the mountains with exceedingly handsome foliage, extending, according to Pinchot and Ashe, down to Stanley, Stokes and Gaston Counties. The narrow red fruit somewhat resembles a cucumber; the leaves are smaller than in any other mountain magnolia, being about 6-8 inches long, and 3-4 inches broad; the flowers are yellowish green; the fruits are 2.5-3 inches long. It is a handsome tree in cultivation, and is best suited for use in the uplands as an ornamental lawn or park tree, or in some cases for planting on narrow streets. In size it does not often exceed 35 feet in height. It was discovered by the two Michaux on a trip from Charleston to the mountains of North Carolina, at a spot ten miles south of Lincolnton.

SOULANGE'S MAGNOLIA (*Magnolia Soulangeana*). Soulange's Magnolia is a large shrub or small tree of oriental origin and is a hybrid between two other Chinese species. The large and very abundant purple and white flowers appear before the leaves in early spring. The leaves are obovate, dark, glossy green, and abundant, expanding after the flowers have fallen. It is best adapted to deep, rich, damp soil in partly shaded locations. It is quite hardy, exceedingly showy, and is



FOREST THEATER AT UNIVERSITY OF NORTH CAROLINA





to be recommended as an ornamental for use on lawns. However, in this section the flowers are often killed by frost very soon after they open or even in the bud.

**SWEET BAY** (*Magnolia virginiana*). Plate 37, fig. 52. Sweet Bay is a small partly evergreen tree found in swamps or bays in the coastal plain, and, according to Curtis, in the middle district also, though rare there. It reaches a height of 30 to 50 feet, with a trunk 2 or 3 inches in diameter. Its leaves are small, averaging less than five inches in length, shiny green above and white beneath. The flowers are white and very fragrant. The cones are small, about 1½ to 2 inches long, and red. Since this tree is a native of moist or swampy places, it is valuable for planting in wet soils in the coast region. It should be used much more often as it is very satisfactory in cultivation. The Sweet Bay was known to early settlers as Beaver-tree because its fleshy roots were eaten by beavers, and, according to Kalm, beavers were caught in traps baited with pieces of these roots.

**SILVER BELL, SNOWDROP TREE** (*Halesia tetraptera*, *Mohrodendron carolinum*). Plate 37, fig. 53. The Silver Bell is found along streams from Surry, Mecklenburg and Davidson Counties west into the mountains. It is usually small, but is said by Ayres and Ashe to reach an occasional height of 100 feet in the rich, damp hollows of the Smoky Mountains. Its leaves are about 3 to 5 inches long and very finely toothed. About the middle of May it is covered with very lovely drooping white flowers that are bell-shaped and pinkish toward the base. The fruit is a dry pod with four broad wings. This tree is very fine, especially when in bloom, and does well in cultivation in rich, deep soil in somewhat sheltered places in or near the mountains.

**GINKGO OR MAIDENHAIR TREE** (*Ginkgo biloba*). Plate 31, fig. 16. The Ginkgo or Maidenhair Tree is a native of China, and is of great botanical interest as it is unlike any other tree. The small, light green leaves are of very remarkable texture and form, resembling much the leaflets of Maidenhair Fern (hence the name), and not unlike the scales of a fish. The branches are straight, not very numerous, and vary curiously in their position, in some trees sticking straight out, in others nearly straight up, in others with both positions or intermediate. It is a very unusual and picturesque tree, and has proven very successful for streets and avenues. In Washington, D. C., there is a fine avenue of Ginkgos leading from the Agricultural Building. It is hardy in nearly all parts of the United States, and is remarkably free from insect pests and fungous disease. The species is a dioecious one like the cedar and yew, with male and female flowers on different individuals. The fruits are about the size of a small plum and have a very bad smelling pulpy flesh around a large round seed. The absence of this bad smelling fruit



makes the male trees preferable for frequented places, but unfortunately the trees flower only when of good size and too late to transplant.

**BLACK GUM, SOUR GUM** (*Nyssa sylvatica*). Plate 35, fig. 38. This tree is common over the whole state, growing both in swamps and uplands. It is usually a narrow, cylindrical tree with short, somewhat drooping branches; its bark is deeply furrowed; its leaves are smooth and shining when mature, turning bright red in late summer or early fall; the fruits are usually three on a common stem, dark blue, about  $\frac{1}{2}$  inch long, sour and bitter, and the stone distinctly ribbed. The robins are very fond of the fruits. The pleasing shape and glossy foliage which rivals the Sugar Maple or Sweet Gum in autumn, and its freedom from attacks of insects and disease make the Sour Gum a very desirable tree for streets or lawns.

**LIME, LINDEN, BASSWOOD** (*Tilia americana*). Plate 32, fig. 24. The lindens are very handsome, healthy trees, rapid growers when young, and best adapted for use in the mountain and Piedmont sections. The American Linden is a stately tree with large shining leaves and clusters of fragrant creamy white flowers which are much sought by bees. The small, nut-like, tomentose fruits are distributed in an interesting and very unusual way. Several nutlets are borne on a common stalk and this is fused over the lower part to a long, leaf-like bract which falls off with the stalk and acts as a sail to carry the fruits away in the wind. The tree is free from insect pests and leaf blight which so frequently attack the European Linden, and is very successful as a street tree. The White or Silver Linden (*Tilia tomentosa*) is slightly smaller than the American Linden. Its leaves, which are dark green above and silvery white beneath, make a striking contrast in color, and make it a very pleasing ornamental tree for lawns.

**BLACK LOCUST** (*Robinia pseudacacia*). Plate 33, fig. 30. The Black Locust is a rather small tree with beautiful fragrant racemes of white flowers which greatly resemble those of Wisteria. The fruit is borne in a flat brown pod. There are small thorns on the twigs and branches, and the trunk is covered with dark, rough or ridged bark. The leaves are compound, with 7 to 19 leaflets, and turn pale yellow in fall. This tree is a native of the mountains, ascending to an altitude of 4000 feet; but in the Piedmont, where it is cultivated, it is often seen around deserted homesteads where it retains possession and multiplies extensively by shoots from the roots. It is especially good for use in borders here and there, on account of its sweet flowers. For quick effect and shade it is also quite useful, as the growth is very rapid in youth. A large grub often attacks the wood of the trunk and may so riddle it as to cause the tree to blow down easily. This has put a stop to the commercial planting of the Black Locust as a supply for railroad ties and posts, for which

its extreme durability well adapts it, but in Chapel Hill this injury has not been so serious as to greatly detract from its value as an ornamental.

**REDBUD, JUDAS TREE** (*Cercis canadensis*). Plate 36, fig. 45. The Redbud or Judas Tree is one of the most beautiful of our native flowering trees, occurring in wooded hillsides and valleys. It is very common in the Piedmont and rarer in the coastal plain. It has light, smooth bark; its leaves are rather large and heart-shaped; its small densely-crowded flowers are magenta-colored and pea-shaped, opening in March before the leaves appear; its fruits are numerous small, flat, brown pods. It is a very decorative tree for lawns, and is especially beautiful in combination with Dogwood in front of evergreens.

**YELLOWWOOD** (*Cladrastis lutea*). Plate 37, fig. 54. The Yellowwood is one of the rarest trees in North Carolina, being known only from Swain, Clay, and Cherokee Counties. It is a very handsome tree in cultivation, forming a symmetrical, rounded head. Its leaves are pinnately compound; the flowers white, fragrant, drooping, and much like Wisteria; the fruit is a pod 3 or 4 inches long. The wood is yellow and yields a clear yellow dye. This tree is fine for planting in lawns or parks in or near the mountains.

**BUCKEYE** (*Aesculus octandra*). Plate 35, fig. 42. The Buckeye is a large tree of the mountains, sometimes reaching a height of 120 feet and a diameter of 4 feet (the shrub or very small tree that extends as far east as Raleigh is probably a different species). The leaves are palmately compound, with 5 to 7 leaflets at the end of each long leaf stalk. They turn yellow in the autumn and fall very early. The flowers are usually greenish yellow, though sometimes red, in clusters 5 to 7 inches long, and less conspicuous than those of the imported European varieties. The fruits are ovoid and enclose large, dark brown, polished seeds or "nuts." The name Buckeye is supposed to have been given by western hunters because of the fancied resemblance of the seeds to a buck's eye. The Buckeye is a hardy tree, extremely adaptable to conditions of soil and climate, though it thrives best in moist, loamy soil. It may be used as a street tree, but is perhaps better as an ornamental shade tree for lawns. The early leaf fall is a serious defect.

**HORSECHESTNUT** (*Aesculus hippocastanum*). Plate 28 and plate 36, fig. 43. The European Horsechestnut, now thought to be a native of the mountains of southern Asia, was introduced into this country from England about the middle of the eighteenth century and has become naturalized in many places. It is a symmetrical, dense-growing tree, sometimes reaching a height of 80 to 100 feet with a trunk 2 or 3 feet in diameter. Its compound leaves are much like those of the Buckeye. They give a heavy shade during the summer, and turn yellow and brown in the fall. The flowers are white tinged with red, forming showy,

upright panicles 8 to 12 inches long. The fruit is prickly, enclosing the large seeds. The Horsechestnut is one of the best large ornamental shade trees for lawns where it will not be crowded. Like the Buckeye, it loses its leaves early.

RIVER, RED OR BLACK BIRCH (*Betula nigra*). Plate 35, fig. 41. River Birch is a tall, graceful, moisture-loving tree, common along creeks and rivers in the Piedmont, and along larger rivers in the mountains and coastal plain. When grown in good soil, it does not require the vicinity of water for full growth. It may be recognized easily by its reddish brown bark which peels off in thin, papery layers, and by the pale and tomentose under-surface of the leaves. The leaves turn dull yellow in autumn. The River Birch is a very picturesque and graceful ornamental.

CHERRY BIRCH, SWEET BIRCH (*Betula lenta*). Plate 35, fig. 39. The Cherry Birch is a fine tall tree, confined in this state to the cool rich soil of the mountains. Its wood is strong, hard, dark in color, and takes a fine polish somewhat like that of Cherry. The wood and bark yield a rather sweet oil by distillation, which is nearly identical with oil of wintergreen. The Cherry Birch may be distinguished from the other birches by its place of growth, its smooth, cherry-like bark, and the strong odor of wintergreen. Its leaves are bright green above, usually heart-shaped at the base, and slightly downy on the veins beneath. It is a fine tree for planting on lawns, parks, or streets in mountainous regions.

EUROPEAN WHITE BIRCH (*Betula alba*). Plate 35, fig. 40. The European White Birch is the common Wild Birch of Europe, from which many interesting varieties have sprung. It is a beautiful tree, delicate and graceful, with white bark and spreading, pendulous branches. The leaves become yellow in autumn. It is a very decorative lawn tree, especially adapted for use in the mountains or in damp and shady places. It is excellent for planting among evergreens. The cut-leaved variety, *laciniata gracilis pendula*, is of even more delicate beauty.

WHITE MULBERRY (*Morus alba*). Plate 34, fig. 31. The White Mulberry is a rapidly-growing small tree with smooth and shining leaves and whitish fruits. It is a native of northern China and was introduced at an early date as food for silkworms in an attempt to establish silk culture in this country. It is imperfectly naturalized in Chapel Hill. This is good looking and is quite desirable for lawns and narrow streets, but only male trees should be planted in such places, as the abundant fruits are a nuisance underfoot. It is well to plant the female trees in borders and out-of-the-way corners, as their fruits are very much liked by birds.

WEeping WILLOW (*Salix babylonica*). Plate 34, fig. 32. This well-known tree is of Asiatic origin, but has become somewhat naturalized

by the twigs which are broken from the tree and scattered along streams and in valleys where they take root rapidly. It is everywhere associated with lakeside planting, and good effects may be obtained by grouping it with evergreens or other trees and shrubs that have darker foliage and bark.

**BLACK WILLOW** (*Salix nigra*). Plate 34, fig. 33. The Black Willow is a small native tree that is common along streams through most of the state. It has dark reddish brown bark and delicate light green foliage, and can be used with excellent effect in landscape work because of its fine contrast with other trees. The leaves are long, narrow, somewhat curved, finely toothed on the margin, and smooth and shining on both sides. It is a very good tree to use in moist or swampy places.

**WHITE WILLOW** (*Salix alba*). Plate 34, fig. 34. The White Willow is a large strong tree with yellowish brown bark and silky, grayish green to silvery gray leaves. It was introduced from Europe as a shade and ornamental tree, and is now much used in damp places in parks and along streams. It grows largest in wet soil, though it does well on uplands. It is one of the best of the willows and is fine in contrast with Black and Yellow Willows.

**YELLOW WILLOW** (*Salix vitellina*). Plate 34, fig. 35. The Yellow Willow is a tree somewhat smaller than the Weeping Willow, with similar leaves and color, but without its drooping habit. Its peculiarity is the golden color of its young wood. When the leaves are on the tree, the yellow twigs seen through them give additional warmth of tone to their color. After the leaves have fallen, the conspicuous yellow still makes the tree attractive, especially if contrasted with evergreens or red- or white-barked trees. It is a fine ornamental tree in moist localities, and is particularly adapted to planting along the banks of streams or ditches to prevent washing of the soil. Fresh branches stuck into wet soil grow with surprising rapidity, and in a few years become good-sized trees, sometimes increasing their trunk diameter at the rate of 3 or 4 inches a year.

**BAY- OR LAUREL-LEAVED WILLOW** (*Salix pentandra*). Plate 34, fig. 36. The Bay- or Laurel-leaved Willow is a small, dense, upright tree with large, very dark green, shining leaves. The bark is light brown. It is of very symmetrical outline, and the foliage is extremely attractive and makes an unusual contrast with lighter greens.

**LOMBARDY POPLAR** (*Populus nigra-italica*). This tree is thought to have originated in Asia and to have been brought from there into Europe at a very early date. It has been a very popular tree in America, and has been so widely planted that it is now as familiar as many of our native trees. It is a strikingly picturesque tree of tall, narrow habit, having the least diameter of head in proportion to its height of any frondose tree



known. It is of very rapid growth, and is most useful for breaking monotonous lines in the landscape or in groups of trees, and for softening the corners of tall buildings. It is not very long-lived in America, and rarely lasts in good condition for more than twenty or thirty years.

CAROLINA POPLAR, COTTONWOOD (*Populus deltoides*). Plate 38, fig. 56. The Carolina Poplar or Cottonwood is a straight, symmetrical, rapid-growing tree which is much used where quick shade and effect are desirable. It is described by Pinchot and Ashe as appearing in its native state in the Piedmont Plateau, and they do not refer to it as appearing in any other section of the state; but Curtis says it is abundant in lower grounds in the Southern States. According to our observations, it is most common in the coastal plain, and enters sparingly into the Piedmont. It is wild in swamps near Charlotte (Brier Creek), but has not been found in Orange County. This poplar has large, heart-shaped leaves 4 to 7 inches long and nearly or quite as broad, smooth and shining on both sides, margins indented with many rounded teeth, drooping and trembling on long leaf stalks. The bark is rather smooth and light. The fruit is a small, pointed pod with silky-hairy seeds, and is so constructed as to give this tree the name of "Necklace Poplar." As a permanent tree, the Carolina Poplar is inferior on account of its short life and lack of character. It also is easily broken, and loses its leaves very early in the fall. The Volga Poplar, sold by a few nurseries is much like it and is said to hold its leaves much longer.

LARGE-TOOTHED POPLAR (*Populus grandidentata*). Plate 38, fig. 57. This is a medium-sized, rather uncommon tree of the cool rich soil in the upper part of the Piedmont. It has stiff, slender branches that form a round-topped crown. The flowers occur in drooping catkins in early spring. Its leaves are 3 to 4 inches long and 2 to 3 inches wide, with distant, blunt teeth, very deep green above, light green below, smooth after maturity and not shining, in autumn turning bright yellow. The very deep green foliage and thrifty appearance of this poplar make it valuable for giving variety in decorative plantings.

SASSAFRAS (*Sassafras varifolium*). Plate 32, fig. 23. The Sassafras is a small aromatic tree of dry soil and is very common over the whole state except on the higher slopes of the mountains. Its bark is roughly furrowed; the leaves are thin and variously shaped; the fruits are blue with swollen red stalks and are borne only on female trees. This tree grows rather rapidly and is desirable for lawn planting on account of its dense and very attractive foliage, and its abundant greenish yellow, aromatic flowers. It has been used very little as a street tree but would be very satisfactory as such, especially on narrow streets and in localities where the soil is dry and poor.



OUTDOOR THEATER AT COKER COLLEGE, HARTSVILLE, S. C.



**PERSIMMON** (*Diospyros virginiana*). Plate 33, fig. 26. The Persimmon is a medium-sized, open-headed tree with handsome, deep green, shining foliage. It is extremely hardy and thrives in almost any kind of soil. It extends from the lower mountains to the sea, but is most plentiful in the upper coastal plain and lower Piedmont. The flowers are of two sorts, male and female, borne on different trees. The male trees are barren; the females bear the well-known fruits which are quite variable in nearly all characters. Contrary to popular belief, some trees ripen their fruit well before frost, and in some the fruit is nearly or quite seedless, as in the tree on the north side of Battle's Grove, Chapel Hill. The Persimmon is useful as a specimen tree on lawns.

**HORNBEAM, IRONWOOD** (*Carpinus caroliniana*). Plate 33, fig. 28. The Hornbeam or Ironwood is a small, crooked tree with a ridged trunk and branches, and smooth, thin, hard bark, and very hard wood. It is common along streams and in rich woods in the middle and western parts of the state, but less common and retiring to deeper swamps in the coastal plain. Its leaves are elm-like, doubly-toothed, bluish green above and yellow-green below, turning yellow in the fall; the fruit is a small, hard nut at the base of a leaf-like bract, which falls off with it and acts as a sail to carry the nut away. The tree is dense and bushy in habit, with branches extending very low on the trunk. It is hardy, remarkably free from insect attacks, and is seen at its best as a specimen tree near water. It would serve admirably for planting along the edges of ditches or creeks that so often occur in school grounds and parks. The name Hornbeam comes from the ridges on the branches which look like those on a deer's horn.

**DOGWOOD** (*Cornus florida*). Plate 36, fig. 44. The Flowering Dogwood is a small, bushy, round-headed tree, very conspicuous and beautiful both when in flower and when in autumn color. The floral display is due to large white or sometimes decidedly pinkish bracts that surround each group of small yellow flowers. Swollen places containing insect larvae are very common along the twigs. The leaves are oval, bright green, turning scarlet in autumn. The fruits are small and bright red. The Dogwood is plentifully scattered through all our woods. It is highly decorative in cultivation and should be much more frequently used on lawns, or in front of evergreens, or between larger trees on streets. It prefers moist soil and some shade.

**NARROW-LEAVED CRAB APPLE** (*Pyrus angustifolia*). Plate 36, fig. 46. The Narrow-leaved Crab Apple is a low, broadly-rounded tree with a short trunk and rigid, thorny, spreading branches. It is most common in the flat woods of the lower coastal plain, extending up along the large rivers into the lower part of the mountain district. The leaves are narrow, toothed, sometimes slightly lobed, thick, dark, glossy green,



and fading in the fall to yellow and bronze. The flowers are large, about an inch across, borne in clusters, pink, and very fragrant. The fruit is a small, fragrant, sour, yellowish green apple about an inch in diameter and often used for preserves. As a specimen tree for garden and lawn, this Crab Apple is very ornamental and desirable, and should be more cultivated. Unfortunately it is badly attacked, like most apples and hawthorns, by the cedar-apple rust, but if cedars are not near this trouble is avoided.

**HAWTHORNS.** The hawthorns are small trees of great hardiness, thriving in almost any kind of soil. They are extremely ornamental, both in flower and in fruit, and are used successfully in combination with shrubs, in groups or borders, or as specimen trees for lawns or parks. There are a large number of species that are hard to classify and the difficulty is augmented by a large amount of variation and hybridization. Almost all the kinds are handsome in cultivation. One of the best is the Washington Thorn (*C. cordata*). Its leaves are  $1\frac{1}{4}$  to 2 inches long and about the same width, usually distinctly three-lobed and somewhat resembling a maple leaf, toothed, and smooth except for a few white hairs along the veins of the upper surface when young. The flowers occur in small clusters about the middle of June near the ends of long peduncles. The fruits are scarlet, globose, and small, being less than  $\frac{1}{2}$  of an inch in diameter. The tree occurs in rich damp soil of the Piedmont, and extends along streams into the mountains.

**AMERICAN, RIVER, OR WILD PLUM** (*Prunus americana*). Plate 36, fig. 48. The American Plum is a somewhat thorny tree reaching 20 or 30 feet in height. It is common along streams in the Piedmont and lower mountains, and along large rivers in the coastal plain. The leaves are ovate, closely toothed, and dark green, turning to yellow and bronze in fall. The flowers are borne in clusters, nearly white to pink in color, very abundant, and rivaling the Japanese Cherry in delicacy and beauty. The fruits are reddish, about  $\frac{3}{4}$  of an inch in diameter, bitterish and scarcely edible, but making a good preserve or jelly. They begin to ripen in August and some trees still have ripening fruit in early October. The Wild Plum is successfully used in groups behind shrubs and lower trees, or as an ornamental on the lawn. It is very showy when in bloom, and deserves to be cultivated widely as an ornamental.

**JAPANESE FLOWERING CHERRY** (*Prunus Sieboldi*). Plate 10. Japanese Flowering Cherry, so famous for its beauty in Japan, is now being much used in this country, and is very fine and well worth trying for an early spring flower display. The flowers are large and white to pink or rose, opening with the first leaves or slightly in advance of them. It will grow in any fertile soil, if it grows at all, but most of the fancy varieties are very temperamental, and often die without apparent

reason. Among the most beautiful varieties are *Alba flore plena*, *Amanogawa-zakura*, *Shirofugen*, *Hi-zakura*, *Mount Fugi*, and *Oku-myako*.

**CREPE MYRTLE** (*Lagerstroemia indica*). The Crepe Myrtle is a splendid, free-flowering shrub or small tree, extensively planted in the South, and thriving in almost any good soil with ample drainage. Its magnificent flowers and fine autumn colors make this one of the most desirable of small trees. There are at least five varieties of flower colors, deep pink or watermelon color, lighter pink, pinkish purple, darker purplish (magenta), and white. Of these, the ones without the purplish tint are the most beautiful. In planting one should try to plant shoots from a tree that is known to be of good color. Shoots from the roots can usually be made to form more abundantly by cutting some of the roots with a spade at some distance from the tree. For planting on streets between larger trees the Crepe Myrtle is particularly fine.

**MIMOSA** (*Albizzia Julibrissin*). Plate 37, fig. 50. The Mimosa is a very attractive small tree of the legume family, introduced originally from Asia but now escaped and well-established in parts of the Piedmont, as in Orange County. It is a rapid grower and is a desirable tree on account of its showy flower heads and open, feathery foliage. It has light, smooth bark; the leaves are divided into 40 or 50 small, sensitive leaflets; the flowers are large, clustered, pink, thready, and sweet-scented; the fruit is a flat pod 2 or 3 inches long. It is an excellent tree for light shade in a section of the garden devoted to the more delicate shade-loving plants such as azaleas, ferns, trilliums, violets, hepaticas, and other woods flowers. It forms a flat-topped crown and gives a decidedly sub-tropical effect. It is valuable as a flowering ornamental in the middle and eastern sections of the state, and like the Crepe Myrtle and Dogwood is very useful for planting on streets between the larger trees.

**SOURWOOD** (*Oxydendrum arboreum*). Plate 37, fig. 51. The Sourwood is a small tree with slender, spreading branches that form a narrow crown. Its shiny, pointed, elliptic leaves have a decidedly sour taste. The small white, sweet-scented flowers are formed on finger-like racemes which are grouped at the ends of branches in summer. They remind one of Lily of the Valley, and make a very attractive centerpiece with ferns. Bees seek them and from them make the esteemed Sourwood honey. The tree is scattered plentifully through most of our woods from the mountains (under 4000 feet), through the Piedmont, and then retiring to bluffs of streams and descending to the coast. It is not adapted to open situations, but prefers wood conditions and cool soil with a mulch of rotting leaves. It is attractive when in flower and in autumn is of even greater charm because of its vivid red coloring. It appears to the best advantage when planted in front of evergreens.

**CHICASAW PLUM** (*Prunus angustifolia*). Plate 37, fig. 49. The Chicasaw Plum is a small, low tree with a dense spreading top, and forms the "plum thickets" so common on the edges of fields and in waste places throughout the state. According to an old Indian tradition, it was brought from beyond the Mississippi. The leaves are small and narrow, and finely toothed. The fruits ripen in early summer and are of varied shape and either red or yellow, about  $\frac{3}{4}$  of an inch in diameter, sweet and edible. This species has given rise to several cultivated plums, such as the Newman and Lone Star. It is useful as a border in front of pines and cedars in parks and large school grounds, the abundant creamy white flowers making a very pleasing effect against the green conifers in early spring.

**CATALPA.** Plate 38, fig. 58. The Catalpa, though not in the first class for beauty, is useful for filling in bare spaces and for planting in borders. Its large heart-shaped leaves are 4 to 12 inches long, and hairy beneath. The flowers are about  $1\frac{1}{2}$  inches long, fragrant, white with purple and yellow dots within and occur in large, showy clusters. The fruit is a long, slender pod 10 to 12 inches long. These trees thrive in almost any soil that is moist, and have been so widely planted in the South as to have become naturalized in many localities. The trunks make most desirable posts, and after 10 or 15 years superfluous trees may be used for this purpose. There are supposed to be two distinct species, the Eastern (*C. catalpa*) and the Western (*C. speciosa*), but they are hard to distinguish and for ornamental purposes may be used indiscriminately.

**CHINA BERRY, "PRIDE OF INDIA"** (*Melia Azedarach*). The China Berry Tree, a native of India and Persia, has been very widely planted, and it has become sparingly naturalized in the Southern States. It is a rapidly growing tree with a broad, round top and rather dense foliage. The leaves are large, doubly and pinnately compound, and with cut leaflets. The flowers, which are lilac-colored and have a heavy fragrance, occur in panicles or clusters which usually open in April. The fruit is a yellowish berry with a ridged stone containing several seeds. As a rule, not all the seeds in the berry come up the same year. A low, spreading variety, called the Umbrella Tree, which originated in Texas, is now very popular. As it is a fast grower the China Berry Tree may be used for quick shade or for screens, but its rather coarse weedy appearance make it much less desirable than several other fast growing trees and, in our opinion, it should be much less used. Especially is this true of the umbrella form which has been much over-exploited in the South.

**PAULOWNIA, PRINCESS TREE** (*Paulownia tomentosa*). The Paulownia or Princess Tree, introduced from China or Japan, is a quick-growing,

coarse tree with large, heart-shaped leaves 6 to 12 inches long or larger on young shoots, and very hairy beneath. The lilac-colored flowers are about  $1\frac{1}{2}$  inches long, have a heavy fragrance, and occur in large upright clusters about a foot long. In winter, the tree is loaded with smooth, pointed, ovate pods about  $1\frac{1}{2}$  inches long, and has conspicuous clusters of velvety buds. It thrives best in moist, rich loam. Though inferior to many of our native trees, it has been planted extensively in yards and has now sparingly escaped in waste places.

### Broad-leaved Evergreen Trees

LIVE OAK (*Quercus virginiana*). Plate 29, fig. 4. This beautiful evergreen tree almost reaches its northern limit in North Carolina, passing into Virginia only up to Norfolk, where it is of small size. In this state it occupies a narrow strip of country along the coast and is plentiful only south of Cape Hatteras. Its wide spreading crown, strong branches and small dense evergreen leaves make an old Live Oak one of the most picturesque objects in the southeastern states. The leaves are usually without teeth or lobes, occasionally toothed near the end; acorns oblong, borne on short or long stalks. The Live Oak makes a fine ornamental tree in cultivation, and is hardy and thrifty at least as far west as Chapel Hill. The wood is very tough and is valued in ship building.

JAPANESE OAK (*Quercus acuta*). For the coastal plain this recently available small evergreen oak has proved of exceptional value. Its dense, shining leaves, rounded crown and healthy growth fit it to take the place here that the Holly-leaved Oak or "Ilex" of the Mediterranean region fills there. A long walk bordered with this oak would give distinction to any grounds. It is best not to prune this at all as it will make a good head anyway and we find that cut branches are apt to be infected and killed by a fungus (*Endothia gyrosa*), related to the chestnut blight.

AMERICAN HOLLY (*Ilex opaca*). Plate 27. This tree, known to every one, was once common throughout the state, but has now become much scarcer through the destructive work of Christmas berry hunters. Even in home grounds it is often raided by vandals. It is especially suited to damp, sandy soil. It is very hard to transplant, but if one will choose small plants and cut off all the branches and leaves, many will live if carefully moved. Our photograph shows the largest holly tree we ever saw.

CAROLINA LAUREL CHERRY (*Laurocerasus caroliniana*). Plate 38, fig. 60. This is a small tree that is well-known in the coastal plain as a fine evergreen for screening outbuildings or for a specimen on the lawn.



It is native to southern swamps near the coast, but only just reaching this state in the southeastern corner. It is too strong a grower to be kept back closely by clipping, but as a free hedge for boundaries or screens there is nothing quite so good and it has the further recommendation of being a native of our state. If planted in a row by a walk (about 3 feet apart and 4 feet from the walk) it can be clipped on the walk side until about 7 feet high, then allowed to grow over the walk, resulting in a fine effect. The same treatment may be followed in the case of Yopon. The abundant black and bitter little cherries that it bears are much liked by the cedar waxwings.

**MAGNOLIA** (*Magnolia grandiflora*). A magnificent and well-known evergreen with large, shiny, deep green leaves and large fragrant white flowers which open in June. It is native to the coastal swamps of the Southern States and just reaches North Carolina, where it is found sparingly in the swamps of Brunswick County. At Chapel Hill young seedlings are occasionally found in the woods.

**PHOTINIA** (*Photinia serrulata*). Plate 12. This small Chinese tree is a beautiful evergreen with a rounded head, dense, deep green, shining leaves that turn red a few at a time before they fall. The flowers are small, whitish and borne in large, flat clusters at the tips of the branches. In winter the large buds are red and conspicuous in contrast with the green. It makes a very fine specimen for the lawn. Our photo shows a plant in bloom.

**AMERICAN OLIVE, DEVILWOOD** (*Osmanthus americanus*). Plate 38, fig. 59. A small evergreen tree or shrub found behind the sand dunes and on the hammocks near the coast. The appearance of the tree is something like the Dahoon Holly, but the leaves are opposite and the fruits are bluish purple, a third to a half inch long, resembling a small olive. The flowers are small but abundant and fragrant. The wood is "devilishly" hard to split, hence the common name. A very attractive tree in cultivation and well adapted to the coastal region. We have found it hardy even in Chapel Hill and able to stand a temperature of 4 degrees F.

**CAMPHOR TREE** (*Camphora officinalis*). This is a very beautiful, small, compact, symmetrical tree of subtropical requirements and of about the same geographical range of usefulness as the Loquat. Along the coast there is no finer evergreen to use on lawns and school grounds. It is closely related to the cinnamon tree and from it is produced by distillation the camphor of commerce.

**LOQUAT, JAPAN PLUM** (*Eriobotrya japonica*). A small tree with large, thick, glossy green leaves that are rusty beneath; the large fragrant flowers in rusty, woolly clusters appearing from summer till winter. The fruit, which is good to eat, rarely matures in this state. A very desirable ornament for a narrow strip along the coast only, and not

fully hardy as far west as Fayetteville. It is fine as a single specimen on the lawn.

**PALMETTO** (*Sabal palmetto*). This striking subtropical tree just reaches this state in the extreme southeastern corner, where it is abundant on Smith Island. It is hardy along a coastal strip including Wilmington and all of New Hanover and Brunswick. Within this area it should be used abundantly.

### Coniferous Trees, all Evergreen Except the First Two

**SWAMP CYPRESS** (*Taxodium distichum*). Plate 39, fig. 62. The Swamp Cypress is a tall, deciduous conifer of the coastal plain swamps, but it thrives also when transplanted to rich porous soil of the uplands. It has delicate, feathery foliage, and is a tree of great beauty when given a chance to develop properly. In youth and middle age the shape is conical as in most conifers, but the lower branches die as the tree gains in height, and in old age the shape changes entirely, the top forming a broadly spreading roof, borne by a long, straight trunk. The small leaves are flat, narrow, and spreading in one plane on short twigs that fall with the leaves in autumn. The cones are spherical, about  $\frac{3}{4}$  inch in diameter, and have thick scales which bear two seeds each. The well known "cypress knees" that surround the trees in wet soil are upgrowths from the roots and are thought to be of use in allowing air to enter the roots. The Cypress is a very ornamental tree and is well suited for low places in parks and for specimen trees on lawns.

**POND CYPRESS** (*Taxodium ascendens*). Plate 39, fig. 61. This tree inhabits savannas and poorly drained bogs, and is usually smaller than the preceding, from which it may be distinguished by the leaves being shorter and pressed against the twigs, although strong sprouts often have the leaves spreading. The bark is also more coarsely ridged and thicker in this species. The tree makes an attractive ornamental under the same conditions as the Swamp Cypress, but the foliage effect is not so dense on account of the scale-like leaves.

**LONG-LEAF PINE** (*Pinus australis*). This large, well-known, and decorative pine is particularly valuable for the eastern part of the state where it is native and can therefore be had without any expense. It is much used on streets and grounds at Pinehurst, Southern Pines and Goldsboro, and other towns could add much to their attractiveness by following their lead. Here in the "State of the Long-leaf Pine" nothing could be more appropriate than this picturesque tree.

**LOBLOLLY PINE, OLD FIELD PINE, NORTH CAROLINA PINE** (*Pinus taeda*). Plate 39, fig. 63. A large tree with needles about six inches long, and cones 3-5 inches long. Abundant in the coastal plain and

eastern part of the middle region, where it covers old fields and is replacing the Long-leaf Pine in good land, then decreasing rapidly and disappearing at the foot of the mountains. Mr. J. S. Holmes, State Forester, estimates that the Loblolly comprises about 20% of our pines in the neighborhood of Chapel Hill, but that even at Hillsboro it drops to 15%. One of the largest Loblolly Pines we know of in North Carolina is on Mr. S. R. Harris' place about six miles from Henderson. It is 11.3 feet in circumference at two feet from the ground. Sargent quotes Edmund Ruffin as saying, "A mast of the United States man-of-war Roanoke, cut in Bertie, had three hundred and two layers of annual growth, one hundred and eighty-six being heartwood, and was forty-one inches in diameter." A boundary of Loblolly Pine and native cedar with small flowering trees in front and intermingled, as Dogwood, Red Bud, Plums, and Hawthorns make a natural and beautiful setting for large open spaces.

**SPRUCE PINE, SCRUB PINE** (*Pinus virginiana*). A small tree with almost smooth bark, drooping branches, very short, twisted needles in pairs, and very small and abundant cones. Plentiful on dry hills and bluffs from Orange County westward to the lower mountain ridges, and sparingly as far east as Wilmington. It can be used to advantage in poor rocky soil and also with the Loblolly Pine to give variety.

**WHITE PINE** (*Pinus strobus*). Needles delicate, bluish green, borne in groups of five or rarely more; branches smooth, cones long and slender, with thin scales. This beautiful and valuable pine is found principally in the mountains, but occurs as far east as Davie County. In addition to its great importance as a timber pine, it is much used as an ornamental tree in cultivation. However, in North Carolina at least, the value of this tree has been greatly lessened by the attacks of the White Pine bark scale, which not only greatly weakens the trees, but makes them very unsightly. In the North the White Pine blister rust is an even worse enemy.

**ROSEMARY PINE, SHORT-LEAF PINE, YELLOW PINE** (*Pinus echinata*). Needles in clusters of two or three, short, 3-5 inches long, not twisted; cones very small, 2 inches long or less. The largest North Carolina pine and an important timber tree; abundant in the middle district where it covers old fields, and is often known as Old Field Pine; much rarer in the coastal plain where it descends to the neighborhood of streams or damp flats; in the mountains it is found only at low elevations. It grows in poor sandy or clay soil.

**MOUNTAIN PINE, PITCH PINE** (*Pinus rigida*). This is a common pine of our mountains and should be used for that section. The leaves are usually in threes, rarely in fours, 3-4½ inches long; the cones resembling those of the Short-leaf Pine but larger, about 2-2½ inches long.

**BLACK SPRUCE** (*Picea mariana*). Plate 39, fig. 64. This is a fine, large tree of the mountains, making up a large part of the Balsam groves of Grandfather, Mitchell, Clingman, the Black Mountains, etc., and often called "He Balsam." It is usually mixed with the true Balsam or Fraser's Fir, from which it can easily be distinguished by its squarish leaves extending in all directions around the twigs, and by the smaller pendent cones. It is adapted to cultivation in the mountain section only.

**NORWAY SPRUCE** (*Picea excelsa*). This is a tall, picturesque, spreading tree with drooping branches; hardy, graceful and of rapid growth. It makes a good windbreak and is far more adaptable and vigorous than our native spruces, succeeding even in the coastal plain. For best results one should select personally the densely growing individuals from the nurseries.

**ORIENTAL SPRUCE** (*Picea orientalis*). This is a very hardy and ornamental middle-sized spruce with dark, dense foliage, native to Asia Minor and the Caucasus. It will succeed at least as far east as Chapel Hill, where we find it a very satisfactory slow-growing conifer for gardens.

**BLUE SPRUCE** (*Picea pungens*). This tree, a native of the western United States, is beautiful in youth and does well in our state. It is remarkable in its color range, a single lot of seedlings often showing all shades from silvery blue to purplish green or green. Its predominant blue color makes it a favorite for contrasting color in massed evergreens. The bluest form is called Koster's Blue Spruce, and there is a pendulous form of that.

**NORDMAN'S FIR** (*Abies Nordmanniana*). A long-lived, dense, and beautiful tree of broadly pyramidal outline, the lower branches holding on indefinitely in open places. The leaves are dark green above, silvery white below. As a lawn specimen, we know of no finer conifer native of the western United States.

**FRASER'S FIR, BALSAM** (*Abies Fraseri*). This charming tree is the true Balsam of the highest mountains. Leaves fragrant, narrow, flat-tish, white below, at least when young; cones 2-3 inches long, standing upright on the branches near the top of the tree, as in all true firs. Here and there in the bark are large blisters filled with clear liquid resin, which may be used as a healing lotion for cuts and for other uses to which Canada Balsam (obtained from *A. balsamea*) is put. This species does better in cultivation in the Southern States than *A. balsamea* and retains its beauty longer, but it will not thrive at all except in or near the mountains.

**WHITE FIR** (*Abies concolor*). This is a light green, hardy, rapid-growing tree, and is one of the most useful firs in cultivation, doing well



throughout the state. It is native to the mountains of the western United States.

DOUGLAS FIR (*Pseudotsuga mucronata*). This is a fine, tall, bright green tree that has proved to be very hardy and thrifty in this state. The small, narrow leaves stand out all around the branches. We find that it makes a pleasing combination with White Pine.

CANADIAN HEMLOCK (*Tsuga canadensis*). Plate 39, fig. 66. A very fine and graceful tree, native to our mountains and one station is known as far east as Wake County, and one of the five or six best conifers for general use in North Carolina. It also makes a good trimmed hedge. There is a dwarf, spreading, pendent variety (var. *Sargentii*) which is excellent for setting off rocks and pool margins.

CAROLINA HEMLOCK (*Tsuga caroliniana*). Plate 39, fig. 65. This is a smaller tree than the Canada Hemlock, and is less abundant and with different habitat, being found only on dry slopes at moderate elevations as on Pinnacle Mountain (near Kanuga), Banner's Elk, Linville Gorge, etc., extending north a little way into Virginia and Tennessee and south into South Carolina and Georgia. It also differs from the common Hemlock in having the leaves pointing in all directions around the twigs, in the somewhat larger cones, about  $1\frac{1}{2}$  inches long, with longer scales, and in the less spreading growth. While beautiful and interesting, it is of much slower growth than the preceding, and seems to be far less adaptable outside of the mountain section. It should be used freely from the center westward.

RED CEDAR (*Juniperus virginiana*). A common native tree found in the woods throughout most of the state and very valuable as a background element. If transplanted when young and with some earth attached, it can be moved without much difficulty. It is very variable in color, form, and density. A deep green, dense tree full of berries is a fine sight, but a straggling, yellowish, pollinate one may be anything but handsome. It should not be placed near apple trees, as the orange balls produced in the spring are caused by a fungous disease which spreads to the apple trees. There are now a number of horticultural forms, among them a very blue one (var. *glauca*) and another very dark green (var. *Cannarii*). These may be had from nurseries.

CHINESE JUNIPER (*Juniperus chinensis*). A pyramidal tree of gray-green color and strong healthy growth that is not particular as to soil; one of the best dense conifers. The variety *procumbens* is a prostrate spreading form of this and according to our experience is the very best and healthiest conifer of this habit. It is very fine among or near rocks or margins of fountains and garden pools.

DEODARA CEDAR (*Cedrus deodara*). A rapid grower and one of the best and most beautiful evergreens for the coastal plain; leaves bluish

green. Will succeed in all sections of North Carolina. It is a native of the Himalaya Mountains. This and the Mount Atlas Cedar and the Cedar of Lebanon are the only true cedars, the other so-called cedars being really junipers. The true cedars have large dry cones something like those of a fir. The Cedar of Lebanon will also grow in this country, and is an interesting tree to have around the place. It is of much slower growth than the other cedars in our climate.

**MOUNT ATLAS CEDAR** (*Cedrus atlantica*). A large pyramidal cedar with glaucous green leaves. The branches are wide and spreading, giving it a very distinct appearance. It is the hardiest of the true cedars, rapid-growing, with wide range of adaptability, but preferring well drained, loamy soil. Good in all sections of the state.

**INCENSE CEDAR** (*Libocedrus decurrens*). Tall, stately, of upright growth with beautiful dark green foliage. Very ornamental and healthy, and one of the best conifers for the middle and eastern sections. It is native to the northwestern United States.

**AMERICAN ARBOR-VITAE** (*Thuja occidentalis*). A small tree of a narrow pyramidal, rather compact form that is useful for formal planting in gardens or for path borders; succeeds in all sections and prefers damp soil. It is a native of eastern North America as far south as Virginia, and a few scattered stations in North Carolina, as Cripple Creek and Linville River. There are a number of varieties for special uses. Some of the best are: var. *pyramidalis*, very narrow and formal; var. *globosa*, small and compact; and var. *filicoides*, broadly pyramidal with crested, fern-like foliage.

**ORIENTAL ARBOR-VITAE** (*Thuja orientalis*). Much like the above and succeeds in all sections. Among the many varieties several of importance are var. *compacta*, small, dense, and bright green; var. *aurea nana* (Berckman's Golden Arbor-vitae), a dwarf golden compact form; var. *pyramidalis*, very narrow, tall, and formal; var. *pyramidalis aurea* (or *aurea pyramidalis*), a golden form of the preceding, and one of the very best; var. *Hoveyi*, a dwarf form, dense, ovate to globose, with bright green foliage.

**JAPANESE CEDAR** (*Cryptomeria japonica*). This is a native of Japan, where it is much used for avenues. With us it is a small, pyramidal tree of rapid growth with horizontal branches and drooping branchlets, the bright green leaves changing to bronze in fall and winter. It does best in the middle and eastern sections.

**CHINESE PINE** (*Cunninghamia lanceolata*). A tree with lance-like leaves on horizontal branches; a rapid, thrifty, and symmetrical grower, attaining a good height and long life. It is one of the best exotics of large size for use on the coastal plain. The lower branches are not persistent, but drop off as in the pines. On old deserted rice plantations

near the coast of South Carolina we have seen magnificent specimens of this tree, apparently approaching a hundred years old. It is a native of China.

ENGLISH YEW (*Taxus baccata*). The English Yew is one of the commonest ornamental evergreens of Europe, where it reaches a very great age. In America it does not do well, but the upright form of it, or Irish Yew (var. *fastigiata*), is successful here and is valuable for growing in formal gardens, at the corners of buildings, etc. It is almost columnar with many slender upright branches and small, dense, deep green leaves. The Japanese Yew (*T. cuspidata*) is also well adapted to America.

PLUM YEW, FORTUNE'S YEW (*Cephalotaxus Fortunei*). A small, sturdy, spreading bush or tree that is good against the house or in angles of walks, and seems to do well in any section of the state. It is odd in having a plum-like fruit. Another species (*C. drupacea*) is also offered by nurseries and is equally good.



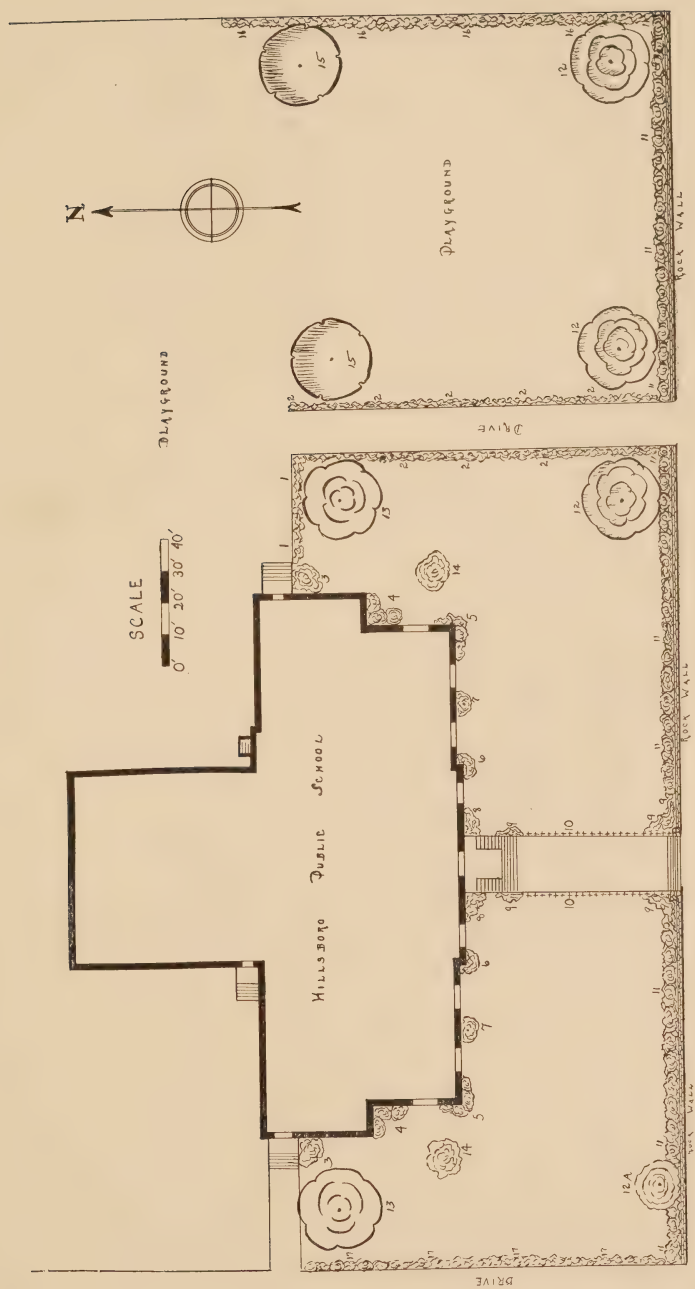


## KEY TO PLANTINGS FOR HILLSBORO PUBLIC SCHOOL

(PLATE 15)

1. Hedge of Japanese Quince.
2. Japanese Barberry.
3. Sweet Breath of Spring.
4. Japanese Privet.
5. Van Houtte's Spirea.
6. Pyramidal Oriental Arbor-vitae.
7. Tree Box.
8. *Photinia serrulata*.
9. Winter-Flowering Jessamine.
10. Purple Iris.
11. Thunberg's Spirea.
12. American Elm. 12a. Found in place.
13. Willow Oak.
14. Crepe Myrtle.
15. White Oak.
16. Trifoliate Orange Hedge.
17. Trailing Rose—Prairie Rose.

PLATE 15

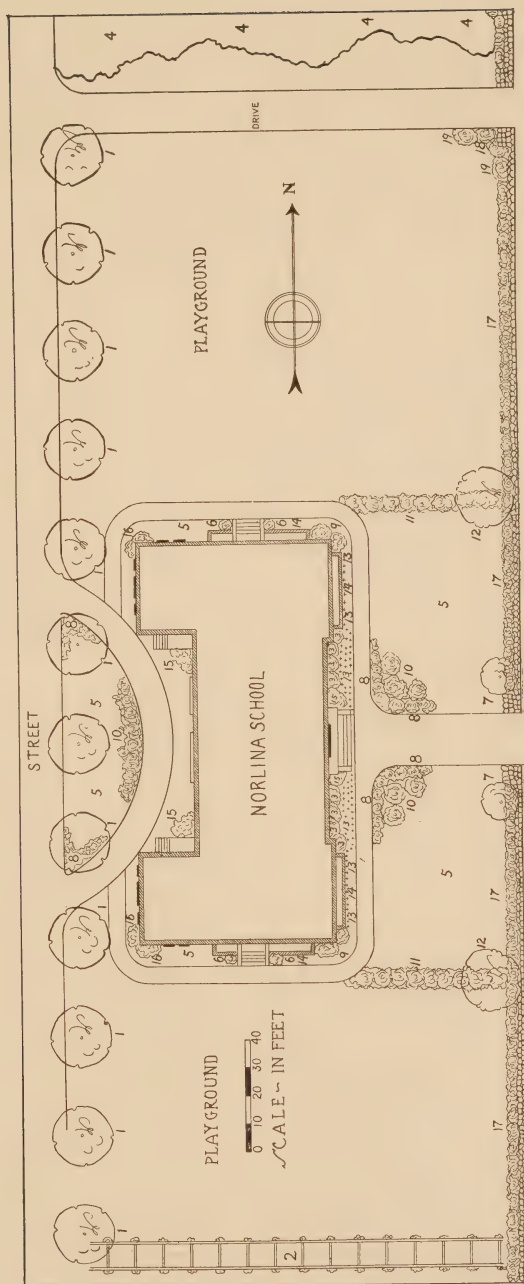


## KEY TO PLANTINGS FOR NORLINA SCHOOL

(PLATE 16)

1. Southern Sugar Maple.
2. Pergola with Wisteria.
3. Abelia.
4. Border of Black Willow, Pine, Cedar, Dogwood, Plum, etc.
5. Grass.
6. Japanese Barberry.
7. Crepe Myrtle.
8. Winter Jessamine.
9. Van Houtte's Spirea.
10. Golden Bell (*Forsythia Fortunei*).
11. Hedge of Japanese Barberry.
12. Linden Tree.
13. Border of Iris.
14. Spring-flowering Bulbs.
15. Sweet Breath of Spring.
16. Japanese Snowball.
17. Thunberg's Spirea—Back of Rock Wall.
18. Japanese Quince.
19. Bridal Wreath (*Spirea prunifolia*).

PLATE 16

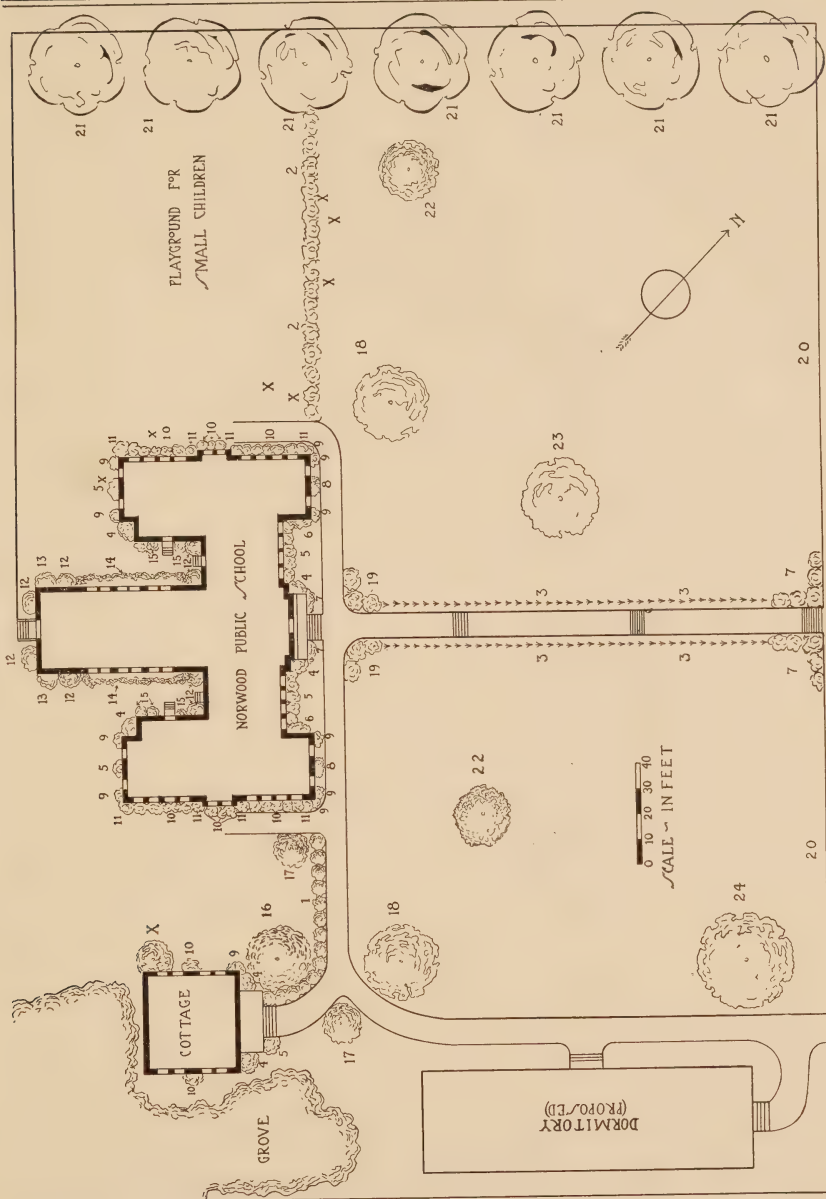




## KEY TO PLANTINGS FOR NORWOOD PUBLIC SCHOOL

(PLATE 17)

1. Hedge of Japanese Quince.
2. Hedge of Japanese Barberry.
3. Row of Iris.
4. Sweet Breath of Spring.
5. Van Houtte's Spirea.
6. Smoke Bush.
7. Winter Jessamine.
8. Japanese Privet.
9. Golden Bell (*Forsythia Fortunei*).
10. *Abelia grandiflora*.
11. Japanese Snowballs.
12. Dogwood.
13. Crab Apple.
14. Ibota Privet (Keep clipped under window).
15. Bridal Wreath.
16. American Elm.
17. Pink Crepe Myrtle.
18. Sugar Maple.
19. McCartney Roses.
20. English Ivy.
21. Row of Red Oaks.
22. Cucumber Tree (*Magnolia cordata*).
23. American Linden.
24. Pin Oak.
- X. Trees Found in Place.



## KEY TO PLANTINGS FOR LONG CREEK SCHOOL

(PLATE 19)

1. Sweet Breath of Spring.
2. Van Houtte's Spirea (between basement windows).
3. Red Cedar (Clipped back until high enough to go over path).
4. Golden Bell (*Forsythia Fortunei*).
5. Dogwood.
6. Iboia Privet.
7. Lilacs.
8. Pin Oak.
9. Sugar Maple.
10. Magnolia.
11. Hedge of McCartney Roses.
12. Crepe Myrtle.
13. Mimosa.
14. Hedge of Japanese Barberry.
15. American Linden.
16. Bridal Wreath (*Spirea prunifolia*).
17. Thunberg's Spirea.
18. McCartney Roses.
19. Deodara Cedar.
20. Willow Oak.
21. White Oak

# PLATE 19

GARAGE

~ PEACH AND APPLE ORCHARD ~

~ PLAYGROUND FOR  
SMALL CHILDREN ~

~ LONG CREEK SCHOOL ~

ROAD

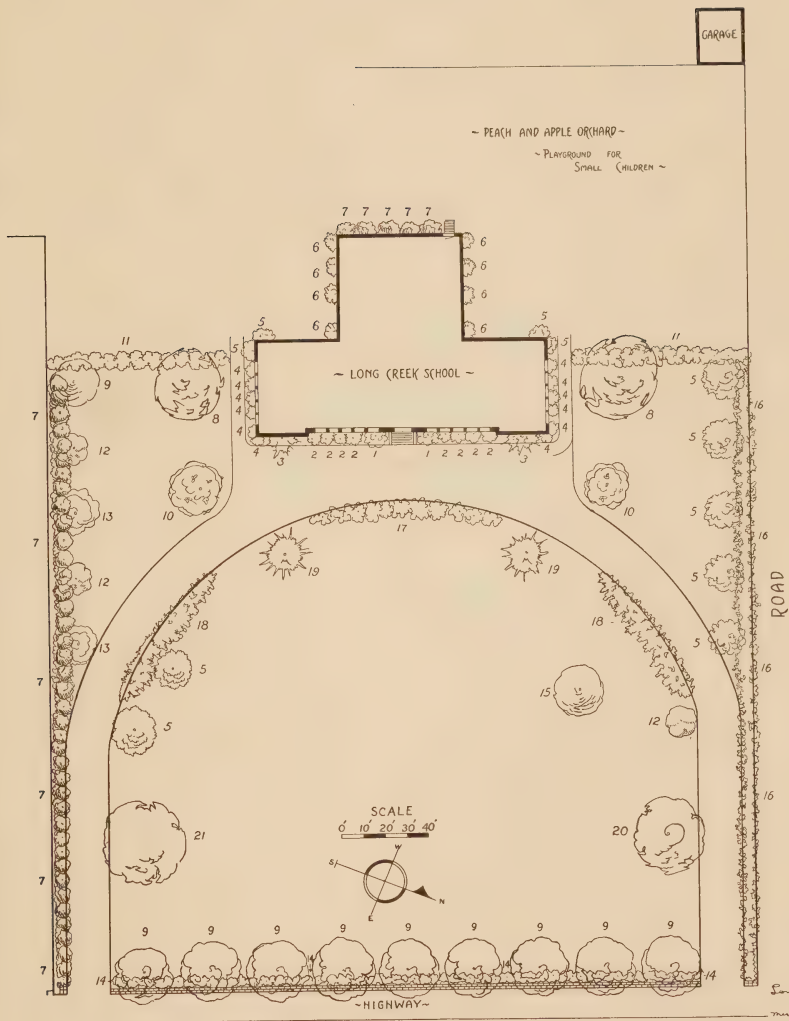
SCALE

0' 10' 20' 30' 40'



~ HIGHWAY ~

Sage Creek  
mud-beds



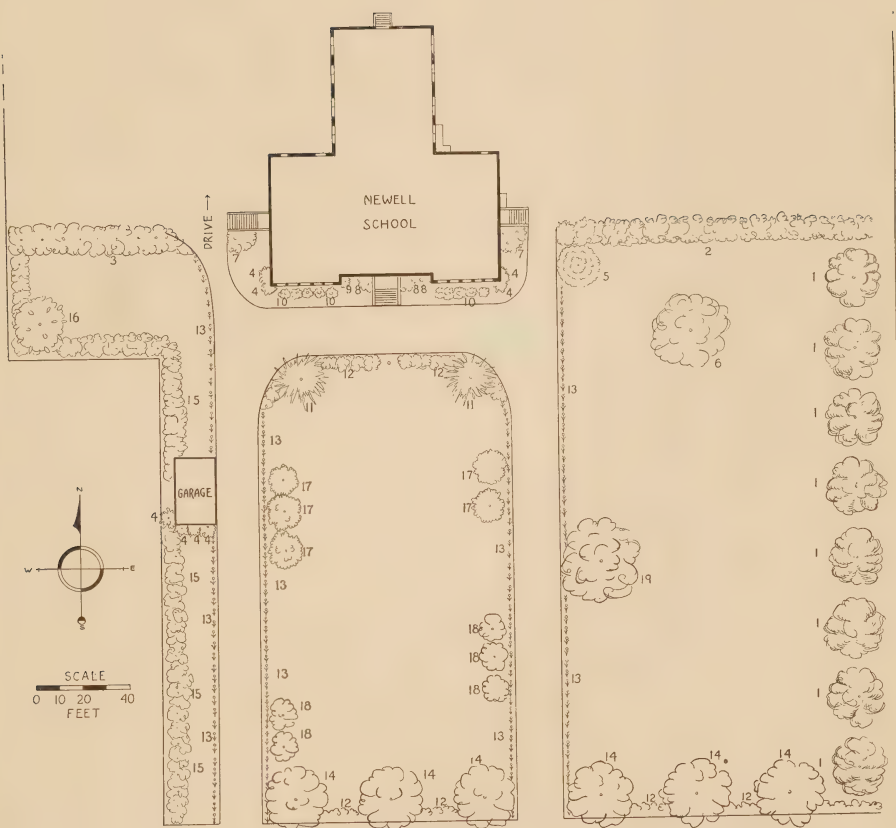


## KEY TO PLANTINGS FOR NEWELL SCHOOL

(PLATE 20)

1. Sugar Maples.
2. Hedge of McCartney Roses.
3. Hedge of Lilacs.
4. Japanese Privet.
5. Magnolia.
6. Pin Oak.
7. Photinia.
8. Sweet Breath of Spring.
9. Van Houtte's Spirea.
10. Japanese Barberry.
11. Deodara Cedars.
12. Hedge of Japanese Barberry.
13. Border of Iris.
14. Willow Oaks.
15. Hedge of Ibota Privet.
16. Horse Chestnut.
17. Dogwood.
18. Pink Crepe Myrtle.
19. American Elm.

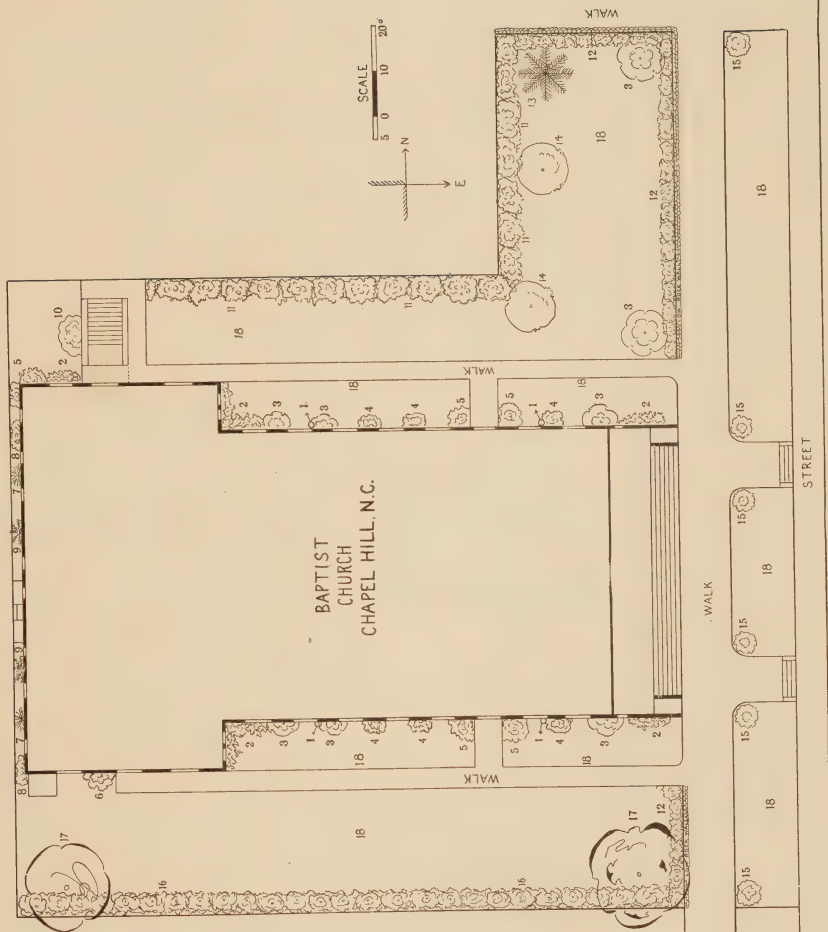
# PLATE 20



## KEY TO PLANTINGS FOR CHAPEL HILL BAPTIST CHURCH

(PLATE 21)

1. Japanese Ivy.
2. Winter Jessamine.
3. Tree Box.
4. Japanese Quince.
5. Japanese Privet.
6. Sweet Breath of Spring.
7. Pyramidal Arbor-vitae.
8. *Abelia grandiflora*.
9. Canada Hemlock.
10. Smoke Bush.
11. Hedge of *Abelia grandiflora*.
12. Hedge of Japanese Barberry.
13. Norway Spruce (Dense form).
14. Crepe Myrtle.
15. Japanese Barberry.
16. Hedge of Bridal Wreath.
17. White Oak (Or White-heart Hickory).
18. Lawn Grass.

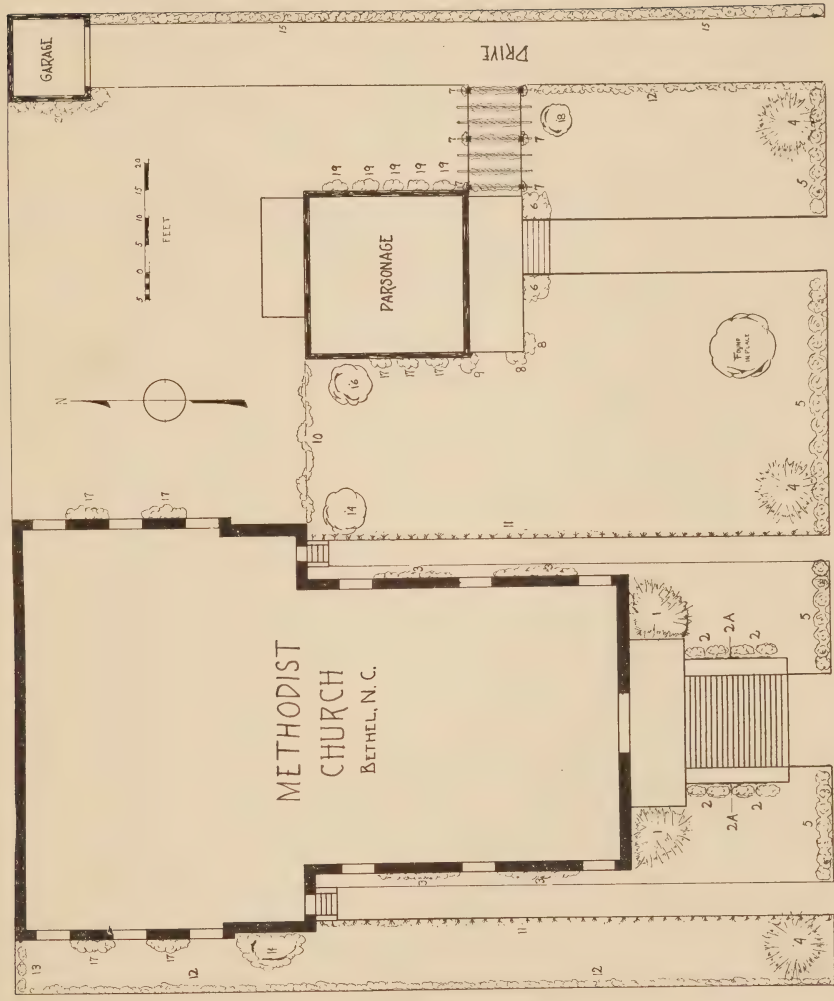


## KEY TO PLANTINGS FOR BETHEL METHODIST CHURCH

(PLATE 22)

1. *Photinia serrulata*.
2. Gold Dust Tree.
- 2a. Ivy—Back of Gold Dust Tree.
3. Japanese Privet.
4. Deodara Cedar.
5. Japanese Barberry.
6. Sweet Breath of Spring.
7. Banksia Roses.
8. *Abelia grandiflora*.
9. Sweet Syringa (*Philadelphus coronarius*).
10. Hall's Honeysuckle—On fence.
11. Border of Iris.
12. Barberry Hedge.
13. Syringa Bushes (*P. coronarius*).
14. Dogwood.
15. Bridal Wreath Hedge.
16. Pink Crepe Myrtle.
17. *Abelia grandiflora*.
18. Soulange's Magnolia.
19. Van Houtte's Spirea.
20. Ibota Privet.





## KEY TO PLANTINGS FOR BETHEL BAPTIST CHURCH

(PLATE 23)

1. Hedge of Bayberry (Wax Myrtle).
2. Carolina Laurel Cherry (*Mock Orange*).
3. Pink Oleander or Althea (Rose of Sharon).
4. Border of Dwarf Box.
5. Holly-leaved Olive.
6. Yopon. 6a. Male Yopon.
7. Tree Box.
8. Van Houtte's Spirea.
9. Sweet Breath of Spring.
10. *Abelia grandiflora*.
11. Japanese Snowballs.
12. *Magnolia grandiflora*.
13. Crepe Myrtle.
14. Willow Oak.

# PLATE 23

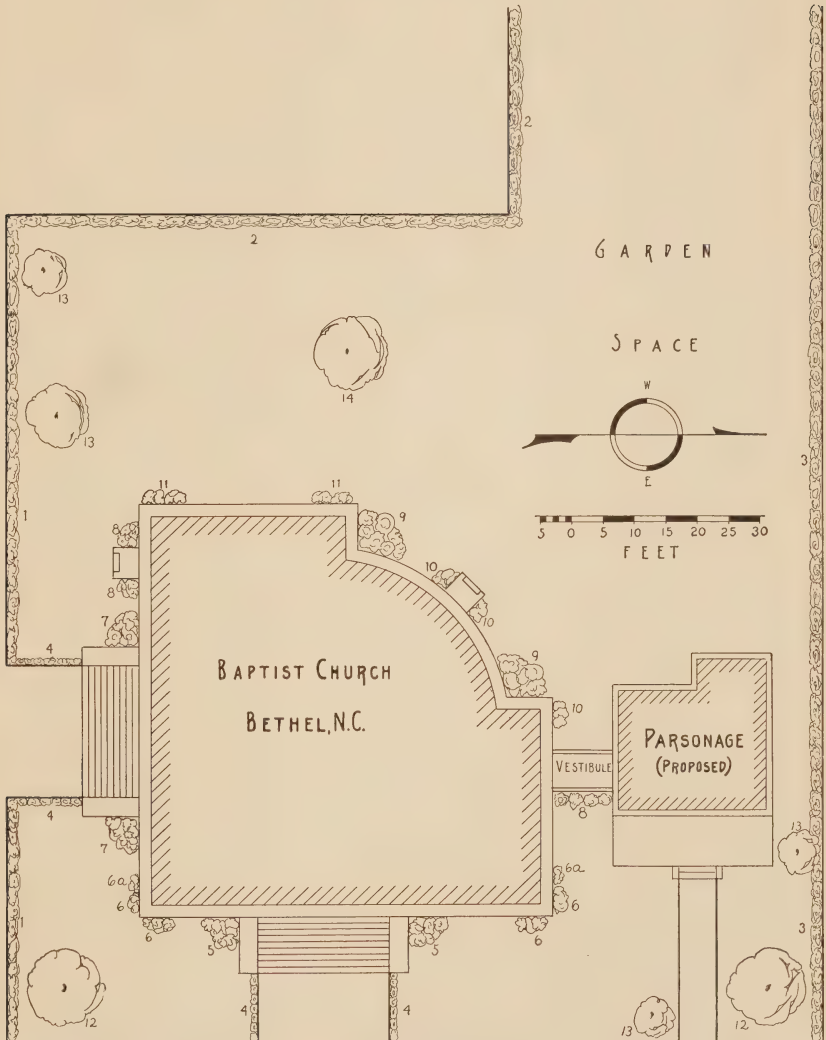




PLATE 24



SOUTHERN RED OAK (*Q. FALCATA*) IN YARD OF MR. W. J.  
ANDREWS, RALEIGH, N. C.

One of the largest specimens in the state

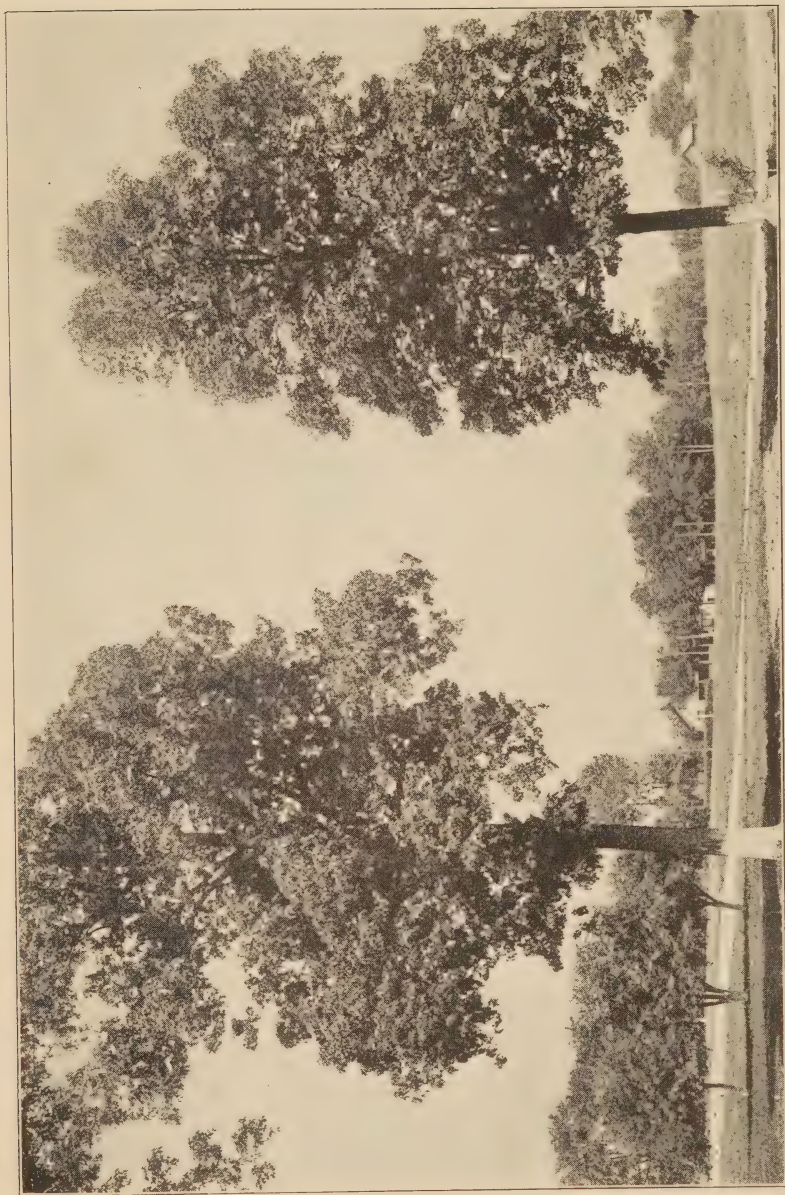






LAUREL OAK AT DARLINGTON, S. C.





WHITE-HEART HICKORY, CHAPEL HILL, N. C.



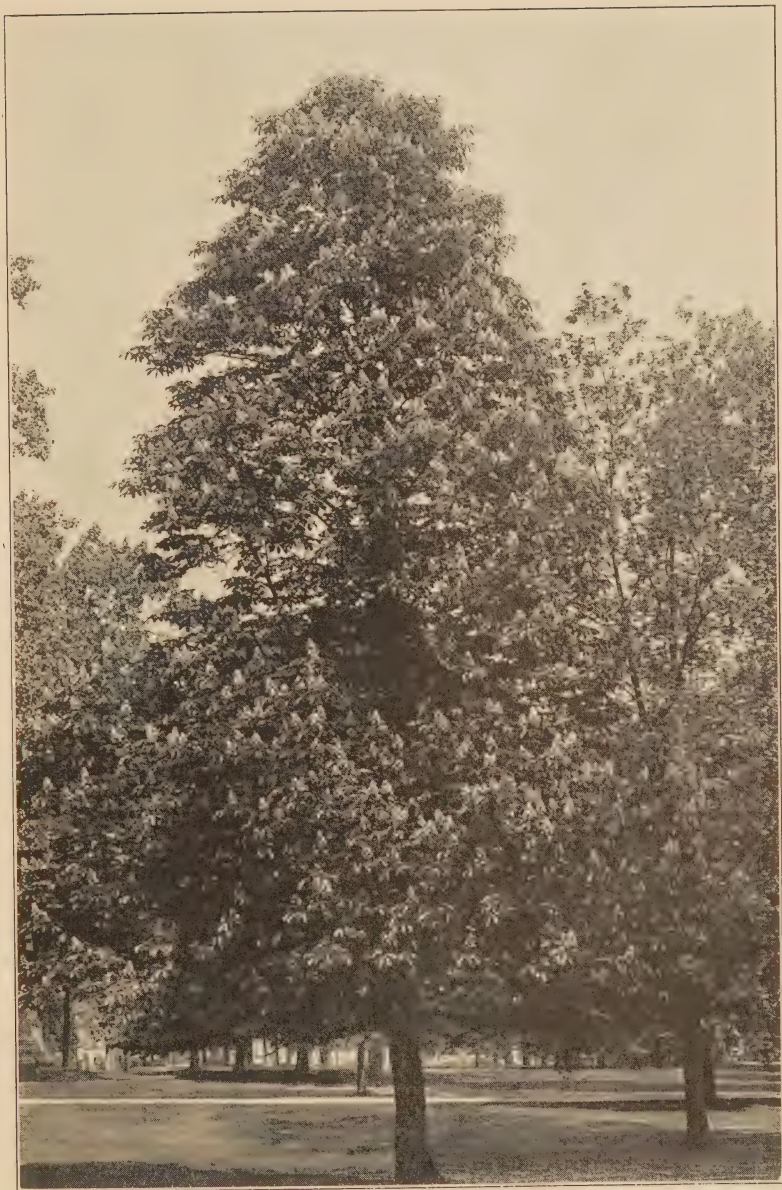


PLATE 27



AMERICAN HOLLY NEAR HARTSVILLE, S. C.  
Diameter 34 in. at 2 ft. from the ground; height about 48 ft.





EUROPEAN HORSECHESTNUT ON CAMPUS OF UNIVERSITY  
OF NORTH CAROLINA



# PLATE 29



FIG. 1. Willow Oak  $\times \frac{2}{3}$



FIG. 2. Laurel Oak  $\times \frac{2}{3}$



FIG. 3. Water Oak  $\times \frac{2}{3}$



FIG. 4. Live Oak  $\times \frac{2}{3}$



FIG. 5. White Oak  $\times \frac{1}{4}$



FIG. 6. Red Oak  $\times \frac{1}{5}$





PLATE 30



FIG. 7. Scarlet Oak  $\times \frac{1}{4}$



FIG. 8. Spanish Oak  $\times \frac{1}{5}$



FIG. 9. Pin Oak  $\times \frac{1}{3}$



FIG. 10. Sugar Maple  $\times \frac{2}{5}$



FIG. 11. Norway Maple  $\times \frac{2}{5}$



FIG. 12. Red Maple  
Leaves  $\times \frac{2}{5}$ ; fruits  $\times \frac{1}{4}$



PLATE 31



FIG. 13. Green Ash  $\times \frac{1}{5}$

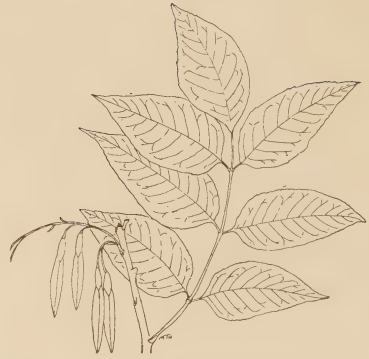


FIG. 14. White Ash  $\times \frac{1}{5}$



FIG. 15. Sweet Gum  $\times \frac{1}{4}$



FIG. 16. Ginkgo  $\times \frac{2}{3}$



FIG. 17. Hackberry  $\times \frac{1}{10}$



FIG. 18. Sycamore  $\times \frac{1}{3}$





PLATE 32



FIG. 19. Tulip Tree  $\times \frac{1}{10}$



FIG. 20. White-heart Hickory  $\times \frac{1}{5}$



FIG. 21. Cucumber Tree  $\times \frac{1}{5}$



FIG. 22. Pecan  $\times \frac{1}{4}$



FIG. 23. Sassafras  
Leaves  $\times \frac{1}{5}$ ; flowers  $\times \frac{20}{5}$



FIG. 24. American Linden  $\times \frac{1}{10}$



# PLATE 33



FIG. 25. Beech  $\times \frac{1}{10}$



FIG. 26. Persimmon  $\times \frac{1}{10}$



FIG. 27. Black Walnut  
Leaf  $\times \frac{1}{5}$ ; nut  $\times \frac{1}{4}$ ; catkin  $\times \frac{1}{10}$



FIG. 28. Hornbeam  $\times \frac{1}{10}$



FIG. 29. White Elm  
Leaves  $\times \frac{1}{4}$ ; fruits  $\times \frac{2}{5}$



FIG. 30. Black Locust  $\times \frac{1}{5}$



PLATE 34



FIG. 31. White Mulberry  $\times \frac{2}{3}$



FIG. 32. Weeping Willow  $\times \frac{2}{3}$



FIG. 33. Black Willow  $\times \frac{2}{3}$



FIG. 34. White Willow  $\times \frac{2}{3}$



FIG. 35. Yellow Willow  $\times \frac{2}{3}$



FIG. 36. Bay Willow  $\times \frac{2}{3}$





PLATE 35



FIG. 37. Kentucky Coffee Tree  $\times \frac{1}{8}$



FIG. 38. Black Gum  $\times \frac{1}{10}$



FIG. 39. Cherry Birch  $\times \frac{2}{3}$



FIG. 40. European White Birch  $\times \frac{1}{10}$



FIG. 41. River Birch  $\times \frac{1}{10}$



FIG. 42. Buckeye  $\times \frac{1}{7}$



# PLATE 36



FIG. 43. Horse Chestnut  
Leaves  $\times \frac{1}{5}$ ; nut  $\times \frac{1}{3}$



FIG. 44. Dogwood  $\times \frac{3}{8}$

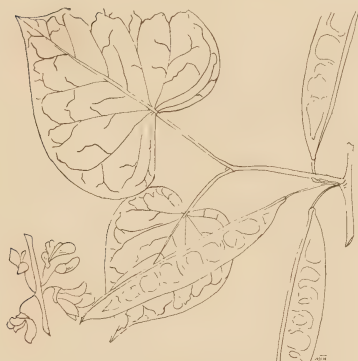


FIG. 45. Red Bud  $\times \frac{2}{3}$



FIG. 46. Crab Apple  $\times \frac{1}{2}$



FIG. 47. Washington Thorn  $\times \frac{1}{2}$



FIG. 48. River Plum  $\times \frac{1}{2}$





PLATE 37



FIG. 49. Chicasaw Plum  $\times \frac{2}{3}$

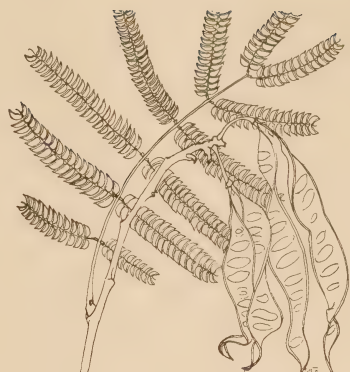


FIG. 50. Mimosa  $\times \frac{1}{3}$



FIG. 51. Sourwood  
Leaves and flowers  $\times \frac{1}{3}$ ; fruits  $\times \frac{1}{4}$



FIG. 52. Sweet Bay  $\times \frac{1}{4}$



FIG. 53. Silver Bell  $\times \frac{1}{3}$



FIG. 54. Yellowwood  $\times \frac{1}{3}$



# PLATE 38



FIG. 55. Ash-leaved Maple  $\times \frac{2}{3}$



FIG. 56. Carolina Poplar  $\times \frac{1}{2}$



FIG. 57. Large-toothed Poplar  $\times \frac{2}{3}$



FIG. 58. Catalpa  
Leaf  $\times \frac{1}{3}$ ; pod  $\times \frac{1}{12}$



FIG. 59. American Olive  $\times \frac{1}{6}$



FIG. 60. Carolina Laurel Cherry  $\times \frac{1}{10}$



PLATE 39



FIG. 61. Pond Cypress  $\times$  675



FIG. 62. Swamp Cypress  $\times$  675

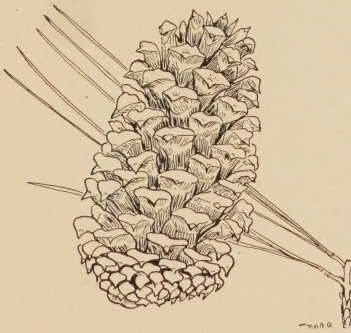


FIG. 63. Loblolly Pine  $\times$  8



FIG. 64. Black Spruce  $\times$  675



FIG. 65. Carolina Hemlock  $\times$  675



FIG. 66. Canada Hemlock  $\times$  675



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